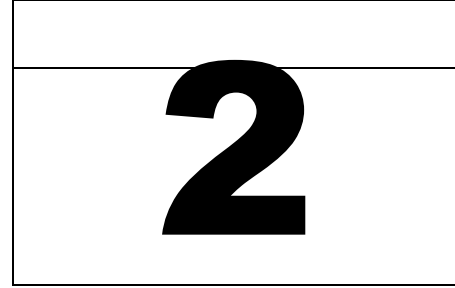




M. A. Akşit Koleksiyonundan



## Buzulların erimesi, Buzul Çağı sonu \*

### The end of melting the Icy Age \*

*M Arif AKŞİT\*\**

*\*Buzul çağı bitince, mümbit yerlere göç başlar, daha iyi mekanlara, imkanlara göç etmişlerdir.*

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*Arkeolojik olarak geçmişe bakınca, insanlar Afrika'dan oranın çölleşmesi ile göçmüşler denir, kalabalıklaşma yanında, yeni yerleşim yerlerini bulmak da bir amaçtır.*

*70-50bin yıl önce, buzulların erimesi ile, Akdeniz 360 metre yükselmiş, Karadeniz boğazlarıyla açılmıştır. Sahra Bölgesi o zamanlar yerleşilen yer, mümbit iken çöllenmiştir. Göç zorunlu olmuştur.*

**B**uzulların erimesi, birçok yerin, buzların/karın erimesi ile mümbit olarak yerleşime açılması olarak da görülmelidir.

Buzul erimesi, diğer Tsunami gibi etkileşim ile yerleşme boyutunu değiştirmektedir. Örneğin, Hz. Musa ile Kızıldeniz'in yarılması da bir Tsunami olarak irdelenmektedir.

Bu Makalede genel sosyal, yerleşme ve diğer konulara bir cevap değil, olayı zamanımızda gibi bakmak yerine, tarihsel boyut olarak irdelenmesi amaçlanmaktadır.

#### Özet

##### **Buzulların erimesi, Buzul Çağı sonu**

**Amaç:** Dünyanın ısınması ile buzulların erimesi, deniz seviyesinin 150 metre kadar yükselmesi ile sonuçlanmıştır. Akdeniz Havzası ise Cebelitarık açılarak, 360metre kadar yükselmiş, boğazlardan Karadeniz gölü iken, deniz olmuştur. Bu Makale, Sahra çölleşmesi ile göçlerin oluşmasının gerekçesini tanımlamaktadır.

**Dayanaklar/Kaynaklar:** Kaynaklar ile, deniz seviyesi yükselmesi ve ılıman bölgeye göçün oluşması Literatür eşliğinde sunulmaktadır.

**Giriş:** Göçün gerekçesine bakınca, Evrenin ısınması ile yaşamın devamlılığını sağlamak için olmaktadır.

**Genel Yaklaşım:** İnsan yaşayacağı ve mesut ve mutlu olduğu yerde olmak istemesi, göçleri doğurmuştur.

**Başlıca boyutlar:** Afrika Sahra Bölgesinin çölleşmesi, yaşam alanı kalmayan insanların göçüne neden olmuştur

**Yaklaşım:** Tarihe bakınca insanların varlığının temelinde göç olgusu vardır.

**Sonuç ve Yorum:** Göç, varlığın devamlılığı açısından, Dünyanın ısınması ile zorunlu olmuştur.

**Anahtar Kelimeler:** Varlık devamlılığı göç ile sağlanmıştır

## Outline

### The end of melting the Icy Age

**AIM:** As the Earth were warming, the sea level increased up to 150 meters, Mediterranean area, from opening or Gibraltar, nearly 360 meters up, and by Bosphorus, the Black Sea turned from lake to sea. From being desert of Sahara, people must migrate for surviving.

**Grounding Aspects:** The melting, ending the Ice Age period, and people migration is indicated by the references.

**Introduction:** The reasoning of migration, by warming of Universe, the surviving of the group, people, must move to fertile lands.

**General Considerations:** Everyone want to be live in safe and at happiness and be in civilization, reasoning of migration is noted.

**Proceeding:** When Sahara in Africa, being a desert, form fertile land, people must migrate to be alive, so, grounding of great migration.

**Notions and Conclusion:** For being presence of Human being, by the warming of this World, migration is obligatory performed.

**Key Words:** Continuing of Human beings, by migration

## Giriş

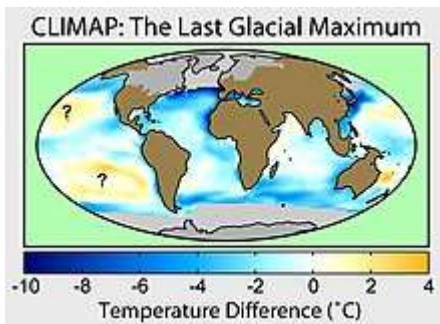
Dünya ısınmış, 33,000 yıl öncesinden başlayan, 20 bin yıl önce belirginleşen bir boyut olarak buzlanmanın çözülmesi olmuş, Afrika Sahra bölgesi, çölleşmiş, yaşanmaz yer olmuştur. İnsanlar göçmüştür.

## Suların, denizin Yükselme Boyutu

Grönland bölgesinde normal zamanımızda, bir dalgalanma, buzullarda, artan ve azalan olmakta, ancak giderek 2-4 derece C, Antarktika dahil düzenli ısınma gözlenmiştir. Okyanusya bile 110 metre yükselmiştir. Kuzey Amerika'da 120 metre deniz yükselmiştir.

Cebelitarık açılmış, Akdeniz dolmuş, 360 metre yükselmiş, Boğazlar açılarak, Karadeniz'e ular ulaşmıştır.

### Last Glacial Maximum. Wikipedia<sup>1</sup>



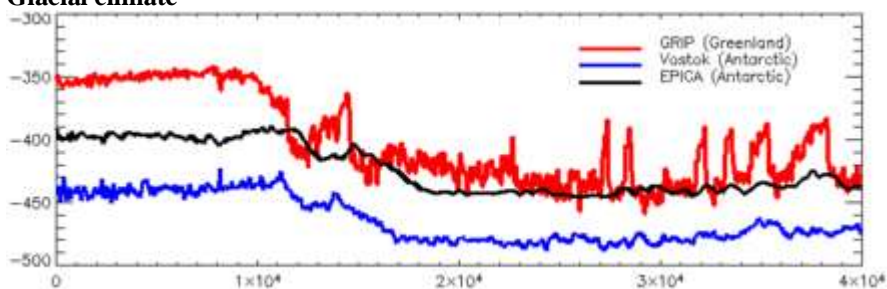
A map of [sea surface temperature](#) changes and glacial extent during the last glacial maximum, according to [Climate: Long range Investigation, Mapping, and Prediction](#), a mapping project conducted by the [National Science Foundation](#) in the 1970s and 1980s

The **Last Glacial Maximum (LGM)**, also referred to as the **Last Glacial Coldest Period**,<sup>[1]</sup> was the most recent time during the **Last Glacial Period** that **ice sheets** were at their greatest extent 26 ka - 20 ka ago.<sup>[2]</sup> Ice sheets covered much of Northern **North America**, **Northern Europe**, and **Asia** and profoundly affected **Earth's** climate by causing a major expansion of deserts,<sup>[3]</sup> along with a large drop in sea levels.<sup>[4]</sup>

Based on changes in position of ice sheet margins dated via **terrestrial cosmogenic nuclides** and **radiocarbon dating**, growth of ice sheets commenced 33,000 years ago and maximum coverage has been estimated to have occurred sometime between 26,500 years ago<sup>[1]</sup> and 20,000 years ago.<sup>[5]</sup> After this, deglaciation commenced in the **Northern Hemisphere**, causing an abrupt rise in sea level. Decline of the West **Antarctica** ice sheet occurred between 14,000 and 15,000 years ago, consistent with evidence for another abrupt rise in the **sea level** about 14,500 years ago.<sup>[6][7]</sup> Glacier fluctuations around the Strait of Magellan suggest the peak in glacial surface area was constrained to between 25,200 and 23,100 years ago.<sup>[8]</sup> Continental ice sheets never reached their isostatic equilibrium during the LGM, as evidenced by high variability in ice volume over short spans of time.<sup>[9]</sup>

The LGM is referred to in Britain as the **Dimlington Stadial**, dated to between 31,000 and 16,000 years.<sup>[10][11]</sup> In the archaeology of **Paleolithic Europe**, the LGM spans the **Aurignacian**, **Gravettian**, **Solutrean**, **Magdalenian** and **Périgordian** cultures.

### Glacial climate



Temperature proxies for the last 40,000 years  
A map of vegetation patterns during the last glacial maximum  
The average global temperature around 19,000 BC (about 21,000 years ago) was about 6 °C (11 °F) colder than today.<sup>[12][13]</sup>

According to the **United States Geological Survey** (USGS), permanent summer ice covered about 8% of Earth's surface and 25% of the land area during the last glacial maximum.<sup>[14]</sup> The USGS also states that sea level was about 125 meters (410 ft) lower than in present times (2012).<sup>[14]</sup>

When comparing to the present, the average global temperature was 15 °C (59 °F) for the 2013–2017 period.<sup>[15]</sup> As of 2012 about 3.1% of Earth's surface and 10.7% of the land area is covered in year-round ice.<sup>[14]</sup>

The formation of an ice sheet or **ice cap** requires both prolonged cold and **precipitation (snow)**. Hence, despite having temperatures similar to those of glaciated areas in **North America** and **Europe**, **East Asia** remained unglaciated except at higher elevations. This difference was because the ice sheets in Europe produced extensive **anticyclones** above them. These anticyclones generated **air masses** that were so dry on reaching **Siberia** and **Manchuria** that precipitation sufficient for the formation of glaciers could never occur (except in **Kamchatka** where these westerly winds lifted moisture from the **Sea of Japan**). The relative warmth of the **Pacific Ocean** due to the shutting down of the **Oyashio Current** and the presence of large east-west mountain ranges were secondary factors that prevented the development of continental glaciation in **Asia**.

All over the world, climates at the Last Glacial Maximum were cooler and almost everywhere drier. In extreme cases, such as **South Australia** and the **Sahel**, rainfall could have been diminished by up to 90% compared to the present, with flora diminished to almost the same degree as in glaciated areas of Europe and North America. Even in less affected regions, **rainforest** cover was greatly diminished, especially in **West Africa** where a few refugia were surrounded by tropical **grasslands**.

The **Amazon rainforest** was split into two large blocks by extensive **savanna**, and the tropical rainforests of **Southeast Asia** probably were similarly affected, with deciduous forests expanding in their place except on the east and west extremities of the **Sundaland** shelf. Only in **Central America** and the **Chocó** region of **Colombia** did tropical rainforests remain substantially intact – probably due to the extraordinarily heavy rainfall of these regions. Most of the world's deserts expanded. Exceptions were in what is the present-day **Western United States**, where changes in the **jet stream** brought heavy rain to areas that are now desert and large **pluvial lakes** formed, the best known being **Lake Bonneville** in **Utah**. This also occurred in **Afghanistan** and **Iran**, where a major lake formed in the **Dasht-e Kavir**.

In [Australia](#), shifting sand dunes covered half the continent, while the [Chaco](#) and [Pampas](#) in [South America](#) became similarly dry. Present-day [subtropical](#) regions also lost most of their forest cover, notably in eastern Australia, the [Atlantic Forest](#) of [Brazil](#), and southern [China](#), where open [woodland](#) became dominant due to much drier conditions. In northern China – unglaciated despite its cold climate – a mixture of grassland and [tundra](#) prevailed, and even here, the [northern limit of tree growth](#) was at least 20° farther south than today.

In the period before the Last Glacial Maximum, many areas that became completely barren desert were wetter than they are today, notably in southern Australia, where [Aboriginal](#) occupation is believed to coincide with a wet period between 40,000 and 60,000 years [Before Present](#) (BP, a formal measurement of uncalibrated [radiocarbon years](#), counted from 1950).

In [New Zealand](#) and neighbouring regions of the Pacific, temperatures may have been further depressed during part of the Last Glacial Maximum by the world's most recent [supervolcanic eruption](#), the [Oruanui eruption](#), approximately 28,500 years BP.

However, it is estimated that during the Last Glacial Maximum, low-to-mid latitude land surfaces at low elevation cooled on average by 5.8 °C relative to their present day temperatures, based on an analysis of noble gases dissolved in groundwater rather than examinations of species abundances that have been used in the past.<sup>[16]</sup>

### **World impact**

During the Last Glacial Maximum, much of the world was cold, dry, and inhospitable, with frequent storms and a dust-laden atmosphere. The dustiness of the atmosphere is a prominent feature in ice cores; dust levels were as much as 20 to 25 times greater than they are in the present.<sup>[17]</sup> This was probably due to a number of factors: reduced vegetation, stronger global winds, and less precipitation to clear dust from [the atmosphere](#).<sup>[17]</sup> The massive sheets of ice locked away water, lowering the sea level, exposing [continental shelves](#), joining land masses together, and creating extensive [coastal plains](#).<sup>[18]</sup> During the last glacial maximum, 21,000 years ago, the sea level was about 125 meters (about 410 feet) lower than it is today.<sup>[19]</sup>

### **Africa and the Middle East**

In Africa and the Middle East, many smaller mountain glaciers formed, and the [Sahara](#) and other sandy deserts were greatly expanded in extent.<sup>[18]</sup>

The [Persian Gulf](#) averages about 35 metres in depth and the seabed between [Abu Dhabi](#) and [Qatar](#) is even shallower, being mostly less than 15 metres deep. For thousands of years the [Ur-Shatt](#) (a confluence of the [Tigris-Euphrates Rivers](#)) provided fresh water to the Gulf, as it flowed through the [Strait of Hormuz](#) into the [Gulf of Oman](#).

[Bathymetric](#) data suggests there were two palaeo-basins in the Persian Gulf. The central basin may have approached an area of 20,000 km<sup>2</sup>, comparable at its fullest extent to lakes such as [Lake Malawi](#) in Africa. Between 12,000 and 9,000 years ago much of the Gulf's floor was not covered by water, only being flooded by the sea after 8,000 years ago.<sup>[20]</sup>

It is estimated that annual average temperatures in Southern Africa were 6 °C lower than at present during the Last Glacial Maximum. This temperature drop alone would however not have been enough to generate widespread [glaciation](#) or [permafrost](#) in the [Drakensberg Mountains](#) or the [Lesotho Highlands](#).<sup>[21]</sup> Seasonal freezing of the ground in the Lesotho Highlands might have reached depths of 2 meter or more below the surface.<sup>[22]</sup> A few small glaciers did however develop during the Last Glacial Maximum, in particular in south-facing slopes.<sup>[21]</sup> In the [Hex River Mountains](#), in the [Western Cape](#), [block streams](#) and terraces found near the summit of Matroosberg evidences past [periglacial activity](#) which likely occurred during the Last Glacial Maximum.<sup>[23]</sup>

On the island of [Mauritius](#) in the [Mascarenhas Archipelago](#), open wet forest vegetation dominated, contrasting with the dominantly closed-stratified-tall-forest state of Holocene Mauritian forests.<sup>[24]</sup>

### **Asia**

A map showing the probable extent of land and water at the time of the last glacial maximum, 20,000 years ago and when the [sea level](#) was likely more than 110 metres lower than it is today.

There were ice sheets in modern [Tibet](#) (although scientists continue to debate the extent to which the [Tibetan Plateau](#) was covered with ice) as well as in [Baltistan](#) and [Ladakh](#). In [Southeast Asia](#), many smaller mountain glaciers formed, and permafrost covered Asia as far south as [Beijing](#). Because of lowered sea levels, many of today's islands were joined to the continents: the Indonesian islands as far east as [Borneo](#) and [Bali](#) were connected to the Asian continent in a landmass called [Sundaland](#). [Palawan](#) was also part of Sundaland, while the rest of the [Philippine Islands](#) formed one large island separated from the continent only by the [Sibutu Passage](#) and the [Mindoro Strait](#).<sup>[25]</sup>



The environment along the coast of South China was not very different from that of the present day, featuring moist subtropical evergreen forests, despite sea levels in the [South China Sea](#) being about 100 metres lower than the present day.<sup>[26]</sup>

### **Australasia**

The Australian mainland, [New Guinea](#), [Tasmania](#) and many smaller islands comprised a single land mass. This continent is now referred to sometimes as [Sahul](#).

Between Sahul and [Sundaland](#) – a peninsula of South East Asia that comprised present-day Malaysia and western and northern Indonesia – there remained an archipelago of islands known as [Wallacea](#). The water gaps between these islands, Sahul and Sundaland were considerably narrower and fewer in number than in the present day.

The two main islands of New Zealand, along with associated smaller islands, were joined as one landmass. Virtually all of the [Southern Alps](#) were under permanent ice cover, with alpine glaciers extending from them into much of the surrounding [high country](#).<sup>[27]</sup>

### **Europe**

The [Last Glacial Maximum refugia](#), c. 20,000 years ago

[Solutrean](#) culture

[Epigravettian](#) culture<sup>[28]</sup>

[Northern Europe](#) was largely covered by ice, with the southern boundary of the ice sheets passing through Germany and Poland. This ice extended northward to cover [Svalbard](#) and [Franz Josef Land](#) and northeastward to occupy the [Barents Sea](#), the [Kara Sea](#), and [Novaya Zemlya](#), ending at the [Taymyr Peninsula](#) in what is now northwestern Siberia.<sup>[29]</sup>

In northwestern [Russia](#), the Fennoscandian Ice Sheet reached its LGM extent approximately 17,000 years ago, about five thousand years later than in Denmark, Germany and Western Poland. Outside the [Baltic Shield](#), and in Russia in particular, the LGM ice margin of the Fennoscandian Ice Sheet was highly lobate. The main LGM lobes of Russia followed the [Dvina](#), [Vologda](#) and [Rybinsk](#) basins respectively. Lobes originated as result of ice following shallow topographic depressions filled with a [soft sediment](#) substrate.<sup>[30]</sup>

[Permafrost](#) covered Europe south of the ice sheet down to as far south as present-day [Szeged](#) in Southern Hungary. Ice covered the whole of [Iceland](#).<sup>[31]</sup> In addition, ice covered Ireland and almost all of Wales, with the southern boundary of the ice sheet running approximately from the current location of [Cardiff](#) north-north-east to [Middlesbrough](#), and then across the now submerged land of [Doggerland](#) to [Denmark](#).<sup>[32]</sup>

In the [Cantabrian Mountains](#) of the northwestern corner of the [Iberian Peninsula](#), which in the present day have no permanent glaciers, the LGM led to a local glacial recession as a result of increased aridity caused by the growth of other ice sheets farther to the east and north, which drastically limited annual snowfall over the mountains of northwestern Spain. The Cantabrian alpine glaciers had previously expanded between approximately 60,000 and 40,000 years ago during a local glacial maximum in the region.<sup>[33]</sup>

In northeastern Italy, in the region around [Lake Fimon](#), [Artemisia](#)-dominated semideserts, steppes, and meadow-steppes replaced open boreal forests at the start of the LGM, specifically during Heinrich Stadial 3. The overall climate of the region became both drier and colder.<sup>[34]</sup>

### **North America**

Northern hemisphere glaciation during the last [ice ages](#) during which three to four kilometer-thick ice sheets caused a [sea level lowering](#) of about 120 m.

Following a preceding period of relative retreat from 52,000 to 40,000 years ago,<sup>[35]</sup> the [Laurentide Ice Sheet](#) grew rapidly at the onset of the LGM until it covered essentially all of Canada east of the Rocky Mountains and extended roughly to the [Missouri](#) and [Ohio Rivers](#), and eastward to [Manhattan](#),<sup>[36][37][38]</sup> reaching a total maximum volume of around 26.5 to 37 million cubic kilometres.<sup>[39][40][41]</sup> At its peak, the Laurentide Ice Sheet reached 3.2 km in height around Keewatin Dome and about 1.7-2.1 km along the Plains divide.<sup>[42]</sup> In addition to the large Cordilleran Ice Sheet in Canada and [Montana](#), [alpine glaciers](#) advanced and (in some locations) ice caps covered much of the Rocky and Sierra Nevada Mountains further south. Latitudinal gradients were so sharp that permafrost did not reach far south of the ice sheets except at high elevations. Glaciers forced the [early human populations](#) who had originally migrated from northeast Siberia into [refugia](#), reshaping their [genetic variation](#) by [mutation](#) and [drift](#). This phenomenon established the older [haplogroups](#) found among [Native Americans](#), and later migrations are responsible for northern North American haplogroups.<sup>[43]</sup>

On the [Island of Hawaii](#), geologists have long recognized deposits formed by glaciers on [Mauna Kea](#) during recent ice ages. The latest work indicates that deposits of three glacial episodes since 150,000 to 200,000 years ago are preserved on the volcano. Glacial moraines on the volcano formed about 70,000 years ago and from about

40,000 to 13,000 years ago. If glacial deposits were formed on [Mauna Loa](#), they have long since been buried by younger lava flows.<sup>[44]</sup>

### South America

During the Last Glacial Maximum [valley glaciers](#) in the southern Andes (38–43° S) merged and descended from the Andes occupying lacustrine and marine basins where they spread out forming large [piedmont glacier lobes](#). Glaciers extended about 7 km west of the modern [Llanquihue Lake](#), but not more than 2 to 3 km south of it. [Nahuel Huapi Lake](#) in Argentina was also glaciated by the same time.<sup>[45]</sup> Over most of the [Chiloé Archipelago](#), glacier advance peaked in 26,000 years BP, forming a long north–south [moraine](#) system along the eastern coast of [Chiloé Island](#) (41.5–43° S). By that time the glaciation at the latitude of Chiloé was of [ice sheet](#) type contrasting to the valley glaciation found further north in Chile.<sup>[46]</sup>

Despite glacier advances much of the area west of Llanquihue Lake was still ice-free during the Last Glacial Maximum.<sup>[47][48]</sup> During the coldest period of the Last Glacial Maximum vegetation at this location was dominated by Alpine herbs in wide open surfaces. The global warming that followed caused a slow change in vegetation towards a sparsely distributed vegetation dominated by [Nothofagus](#) species.<sup>[47][48]</sup> Within this parkland vegetation [Magellanic moorland](#) alternated with [Nothofagus](#) forest, and as warming progressed even warm-climate trees began to grow in the area. It is estimated that the [tree line](#) was depressed about 1,000 m relative to present day elevations during the coldest period, but it rose gradually until 19,300 years BP. At that time a cold reversal caused a replacement of much of the arboreal vegetation with Magellanic moorland and Alpine species.<sup>[48]</sup>

Little is known about the extent of glaciers during Last Glacial Maximum north of the [Chilean Lake District](#). To the north, in the [dry Andes](#) of [Central](#) and the Last Glacial Maximum is associated with increased humidity and the verified advance of at least some mountain glaciers.<sup>[49]</sup> In northwestern Argentina, pollen deposits record the altitudinal descent of the treeline during the LGM.<sup>[50]</sup>

In the Southern Hemisphere, the [Patagonian Ice Sheet](#) covered the whole southern third of Chile and adjacent areas of Argentina. On the western side of the Andes the ice sheet reached sea level as far north as in the [41 degrees south](#) at [Chacao Channel](#).<sup>[citation needed]</sup> The western coast of [Patagonia](#) was largely glaciated, but some authors have pointed out the possible existence of ice-free refugia for some plant species. On the eastern side of the Andes, glacier lobes occupied the depressions of [Seno Skyring](#), [Seno Otway](#), [Inútil Bay](#), and [Beagle Channel](#). On the Straits of Magellan, ice reached as far as [Segunda Angostura](#).<sup>[51]</sup>

### Atlantic Ocean

[Atlantic meridional overturning circulation](#) was weaker and more shallow during the LGM.<sup>[52]</sup> Sea surface temperatures in the western subtropical gyre of the North Atlantic were around 5 °C colder compared to today. Intermediate depth waters of the North Atlantic were better ventilated during the LGM by Glacial North Atlantic Intermediate Water (GNAIW) relative to its present-day ventilation by upper North Atlantic Deep Water (NADW). GNAIW was nutrient poor compared to present day upper NADW. Below GNAIW, southern source bottom water that was very rich in nutrients filled the deep North Atlantic.<sup>[53]</sup>

Due to the presence of immense ice sheets in Europe and North America, continental weathering flux into the North Atlantic was reduced, as measured by the increased proportion of radiogenic isotopes in neodymium isotope ratios.<sup>[54]</sup>

In the western [South Atlantic](#), where [Antarctic Intermediate Water](#) forms, sinking particle flux was heightened as a result of increased dust flux during the LGM and sustained export productivity. The increased sinking particle flux removed neodymium from shallow waters, producing an isotopic ratio change.<sup>[55]</sup>

### Pacific Ocean

Abyssal Pacific overturning was weaker during the LGM than in the present day, although it was temporarily stronger during some intervals of ice sheet retreat.<sup>[56]</sup> Evidence suggests that the Peruvian Oxygen Minimum Zone in the eastern Pacific was weaker than it is in the present day, likely as a result of increased oxygen concentrations in seawater permitted by cooler ocean water temperatures, though it was similar in spatial extent.<sup>[57]</sup>

The outflow of [North Pacific Intermediate Water](#) through the Tasman Sea was stronger during the LGM.<sup>[58]</sup>

In the [Great Barrier Reef](#) along the coast of [Queensland](#), reef development shifted seaward due to the precipitous drop in sea levels, reaching a maximum distance from the present coastline as sea levels approached their lowest levels around 20,700–20,500 years ago.<sup>[59]</sup>

### Southern Ocean

Evidence from sediment cores in the [Scotia Sea](#) suggests the [Antarctic Circumpolar Current](#) was weaker during the LGM than during the Holocene.<sup>[60]</sup>

Late Glacial Period

The **Late Glacial Period** followed the LGM and preceded the **Holocene**, which started around 11,700 years BP.<sup>[61]</sup>

## Zanclean flood, Wikipedia<sup>2</sup>

Artistic interpretation of the flooding of the **Mediterranean** through the **Gibraltar Strait** (A) and the **Strait of Sicily** (F) about 5.3 million years ago. Artistic interpretation of the flooding of the Mediterranean through the Gibraltar Strait. Artistic interpretation of the flooding of the Mediterranean through the Gibraltar Strait, with the vertical scale exaggerated for better visualization. The view in this image is from the southwest of Gibraltar, with the future **Iberian Peninsula** in the center-left, **northwest Africa** in the lower-right, and the **British Isles** in the upper-left corner.

The **Zanclean flood** or **Zanclean deluge** is a **flood** theorized to have refilled the **Mediterranean Sea** 5.33 million years ago.<sup>[1]</sup> This flooding ended the **Messinian salinity crisis** and reconnected the Mediterranean Sea to the Atlantic Ocean, although it is possible that even before the flood there were partial connections to the Atlantic Ocean.<sup>[2]</sup> The reconnection marks the beginning of the **Zanclean age**.

According to this model, water from the **Atlantic Ocean** refilled the **dried up basin** through the modern-day **Strait of Gibraltar**. The **Mediterranean Basin** flooded mostly during a period estimated to have been between several months and two years.<sup>[3]</sup> Sea level rise in the basin may have reached rates at times greater than ten metres per day (thirty feet per day). Based on the erosion features preserved until modern times under the **Pliocene** sediment, **García-Castellanos et al.** estimate that water rushed down a drop of more than 1 kilometer (0.6 mi) with a maximum discharge of about 100 million cubic metres per second (3.5 billion cubic feet per second), about 1,000 times that of the present-day **Amazon River**. Studies of the underground structures at the Gibraltar Strait show that the flooding channel descended gradually toward the bottom of the basin rather than forming a steep waterfall.<sup>[4]</sup>

### Background

The geologic history of the **Mediterranean** is governed by **plate tectonics** involving the **African Plate**, the **Arabian Plate** and the **Eurasian Plate** which shrank the previously existing **Tethys Ocean** until its western part became the present-day Mediterranean.<sup>[5]</sup> For reasons not clearly established, during the latest **Miocene** the Mediterranean was severed from the **Atlantic Ocean** and partly dried up when the **Guadalhorce** and **Rifian** corridors that had previously connected the Mediterranean to the Atlantic closed,<sup>[6]</sup> triggering the **Messinian Salinity Crisis** with the formation of thick salt deposits on the former seafloor<sup>[7]</sup> and erosion of the continental slopes.<sup>[8]</sup> The **Nile** and **Rhône** carved deep **canyons** during this time.<sup>[4]</sup> Water levels in the Mediterranean during this time dropped by kilometres;<sup>[9]</sup> the exact magnitude of the drop and whether it was symmetric between the **Western Mediterranean** and the **Eastern Mediterranean** is unclear;<sup>[10]</sup> it is possible that interconnected seas remained on the floor of the Mediterranean.<sup>[11]</sup>

The presence of Atlantic fish in Messinian deposits<sup>[11]</sup> and the volume of salt deposited during the Messinian Salinity Crisis implies that there was some remnant flow from the Atlantic into the Mediterranean even before the Zanclean flood.<sup>[6]</sup> Already before the Zanclean flood, increased precipitation and **runoff** had lowered the salinity of the remnant sea,<sup>[7]</sup> with some water putatively originating in the **Paratethys** north of the Mediterranean.<sup>[12]</sup>

### Event

The Zanclean flood occurred when the **Strait of Gibraltar** opened.<sup>[13]</sup> Tectonic subsidence of the Gibraltar region may have lowered the **sill** until it breached.<sup>[7]</sup> The exact triggering event is not known with certainty; **faulting** or **sea level rise** are debatable. The most widely accepted hypothesis is that a stream flowing into the Mediterranean eroded through the Strait of Gibraltar until it **captured** the Atlantic Ocean<sup>[9]</sup> and that the Strait did not exist before this erosion event.<sup>[14]</sup>

During the flood, a channel formed across the Strait of Gibraltar,<sup>[13]</sup> which starts at the **Camarinal Sill** in the Strait of Gibraltar,<sup>[15]</sup> splits around the Vizconde de Eza high of the **Alboran Sea**<sup>[16]</sup> and eventually connects with the **Alboran Channel** before splitting into several branches that end in the Algero-Balear basin.<sup>[15][17]</sup> The channel has a U-like shape in its starting region, which is consistent with its formation during a giant flood.<sup>[18]</sup> The sector of the Zanclean channel that passes through the Camarinal Sill may have a different origin, however.<sup>[10]</sup>

Whether the Zanclean flood occurred gradually or as a catastrophic event is controversial.<sup>[19]</sup> The magnitude of a catastrophic flood has been simulated by modelling. One single-dimensional model assumes a catastrophic flood of more than 10–100 **sverdrup**.<sup>[note 1]</sup> Another estimate assumes that after the first breach of the sill, the flowing water eroded the threshold and formed the channel across the Gibraltar strait, increasing the flow of water which in turn increased the erosion until water levels rose enough in the Mediterranean to slow the flood.<sup>[18]</sup>

Under such a scenario, a peak discharge of over 100,000,000 cubic metres per second ( $3.5 \times 10^9$  cu ft/s) occurred with water velocities of over 40 metres per second (130 ft/s); such flow rates are about a thousand times larger than the discharge of the [Amazon River](#) and ten times as much as the [Missoula Floods](#).<sup>[22]</sup> This flood would have descended a relatively gentle ramp into the Mediterranean basin, not as a giant [waterfall](#).<sup>[23]</sup> Later simulations using more explicit geography constrain the flow to about 100 sverdrup, which is about 100,000,000 cubic metres per second ( $3.5 \times 10^9$  cu ft/s). They further indicate the formation of large [gyres](#) in the [Alboran Sea](#) during the flooding<sup>[20]</sup> and that the flood eroded the Camarinal Sill at a rate of 0.4–0.7 metres per day (1.3–2.3 ft/d).<sup>[24]</sup> The exact size of the flood is dependent on the pre-flood water levels in the Mediterranean and higher water levels there would result in a much smaller flood.<sup>[25]</sup>

The flood affected only the [Western Mediterranean](#) at first, because the Sicily Sill (located at the present [Straits of Sicily](#)) formed a barrier separating its basin from the [Eastern Mediterranean](#) basin<sup>[26]</sup> that probably overflowed through the Noto Canyon across the [Malta Escarpment](#),<sup>[27]</sup> in addition a sill may have existed in the eastern Alboran Sea at this time.<sup>[28]</sup> While it was at first assumed that the filling of the eastern Mediterranean would have taken thousands of years, later estimates of the size of the Strait of Gibraltar channel implied that it would have taken much less, potentially less than a year until reconnection.<sup>[29]</sup>

A large flood is not the only explanation for the reconnection of the Mediterranean with the Atlantic and concomitant environmental changes; more gradual reflooding of the Mediterranean including reflooding through other water sources is also possible.<sup>[30][31]</sup> The absence of a catastrophic flooding event is supported by geological evidence found along the southern margin of the Alboran Sea.<sup>[32]</sup>

### Timing

The timing of the Zanclean flood is uncertain, with one possibility being a flood around 5.33 million years ago;<sup>[33]</sup> the end of the [Messinian/Miocene](#) and beginning of the [Zanclean/Pliocene](#) is usually associated with the flood.<sup>[34]</sup> The main Zanclean flood may have been preceded by an earlier smaller flood event,<sup>[10][35]</sup> and the presence of deep sea terraces has been used to infer that the refilling of the Mediterranean occurred in several pulses.<sup>[36]</sup> Complete refilling of the Mediterranean may have taken about a decade.<sup>[7]</sup>

### Consequences

The Zanclean flood created the [Strait of Gibraltar](#); it is doubtful that tectonic or volcanic events could have created the strait since the main plate boundaries do not run through the strait and there is little seismic activity in its area.<sup>[37]</sup> The current morphology of the strait is characterized by two [aquatic sills](#): [Camarinal Sill](#), which is 284 m (932 ft) at its deepest point; and the deeper [Espartel Sill](#)<sup>[38]</sup> farther west. The narrowest part of the strait is located east of either sill,<sup>[39]</sup> and it is considerably deeper than the sills.<sup>[38]</sup> It is possible that these sills were formed after the flood through gravity-induced movement of neighbouring terrain.<sup>[40]</sup>

The Zanclean flood caused a major change in the environment of the Mediterranean basin; the continental "Lago Mare" facies was replaced by [Zanclean](#) deep sea deposits.<sup>[7]</sup> The flood may have affected global climate, considering that the much smaller flood triggered when [Lake Agassiz](#) drained did result in a cold period.<sup>[41]</sup> The hypothesized remote effects reached as far as the [Loyalty Ridge](#) next to [New Caledonia](#) in the Southern Hemisphere.<sup>[42]</sup>

Rising sea levels made the deeply [incised Nile river](#) become a [ria](#) as far inland as [Aswan](#), some 900 km (560 mi) upstream from the modern coast.<sup>[43]</sup> The Zanclean flood resulted in the final isolation of numerous Mediterranean islands such as [Crete](#),<sup>[44]</sup> resulting in [speciation](#) of animals found there.<sup>[45]</sup> On the other hand, the formation of the Gibraltar Strait prevented land animals from crossing over between Africa and Europe.<sup>[46]</sup> Further the reconnection allowed sea animals such as [cetaceans](#) and their ancestors and [pinnipeds](#) to colonize the Mediterranean from the Atlantic.<sup>[47]</sup>

Evidence of the flooding has been obtained on Zanclean-age sediments, both in [boreholes](#) and in sediments that were subsequently uplifted and raised above sea level.<sup>[48]</sup> A sharp erosional surface separates the pre-Zanclean flood surface from the younger deposits, which are always marine in origin.<sup>[49]</sup>

The waters flooding into the [Western Mediterranean](#) probably overspilled into the [Ionian Sea](#) through [Sicily](#) and the Noto [submarine canyon](#)<sup>[50]</sup> offshore [Avola](#),<sup>[51]</sup> the spillover flood had a magnitude comparable to the flood in the Strait of Gibraltar.<sup>[52]</sup> The rates at which the Mediterranean filled during the flood were more than enough to trigger substantial [induced seismicity](#).<sup>[53]</sup> Resulting large [landslides](#) would have sufficed to create large [tsunamis](#) with wave heights reaching 100 m (330 ft), evidence of which has been found in the [Algeciras Basin](#).<sup>[54]</sup> The infilling of the basin created tectonic stresses, which would have influenced the development of the [Apennine Mountains](#).<sup>[55]</sup>

Similar megafloods



Similar floods have occurred elsewhere on Earth throughout history; examples include the [Bonneville flood](#) in North America,<sup>[4]</sup> during which [Lake Bonneville](#) overflowed through [Red Rock Pass](#) into the [Snake River Basin](#), and the [Black Sea deluge hypothesis](#) that postulates a flood from the Mediterranean into the [Black Sea](#) through the [Bosporus](#).<sup>[56]</sup>

### Black Sea deluge hypothesis, Wikipedia<sup>3</sup>

The **Black Sea deluge** is the best known of three hypothetical flood scenarios proposed for the Late [Quaternary](#) history of the [Black Sea](#). One other flood scenario proposes a rapid, even catastrophic, rise in sea level of the Black Sea.<sup>[1][2]</sup>

History



[Black Sea](#) today (light blue) and in 7550 [YBP](#) (dark blue) according to the hypothesis by Ryan and Pitman

In 1997, William Ryan, [Walter Pitman](#), [Petko Dimitrov](#), and their colleagues first published the *Black Sea deluge hypothesis*. They proposed that a catastrophic inflow of [Mediterranean seawater](#) into the Black Sea [freshwater lake](#) occurred around 7600 years ago, c. 5600 BC.<sup>[3][4]</sup>

As proposed, the Early Holocene Black Sea flood scenario describes events that would have profoundly affected prehistoric settlement in eastern Europe and adjacent parts of Asia and possibly was the basis of oral history concerning [Noah's flood](#).<sup>[4]</sup> Some archaeologists support this theory as an explanation for the lack of [Neolithic](#) sites in northern Turkey.<sup>[5][6][7]</sup> In 2003, Ryan and coauthors revised the dating of the early Holocene flood to 8800 years ago, c. 6800 BC.<sup>[8]</sup>

Before that date, [glacial meltwater](#) had turned the Black and [Caspian seas](#) into vast freshwater lakes draining into the [Aegean Sea](#). As glaciers retreated, some of the rivers emptying into the Black Sea declined in volume and changed course to drain into the [North Sea](#). The levels of the lakes dropped through evaporation, while changes in worldwide [hydrology](#) caused global sea levels to rise.<sup>[8][9]</sup>

The rising [Mediterranean](#) finally spilled over a rocky [sill](#) at the [Bosporus](#). The event flooded 100,000 km<sup>2</sup> (39,000 sq mi) of land and significantly expanded the Black Sea shoreline to the north and west. According to these researchers, 50 km<sup>3</sup> (10 cu mi) of water poured through each day, two hundred times the flow of [Niagara Falls](#). The Bosporus valley roared and surged at full spate for at least three hundred days. They argued that the catastrophic inflow of seawater resulted from an abrupt sea-level jump that accompanied the [Laurentide Ice Sheet](#) collapse and the ensuing breach of a bedrock barrier in the Bosporus strait.<sup>[8][9]</sup>

#### Popular press accounts

Popular discussion of this early Holocene Black Sea flood scenario was headlined in *The New York Times* in December 1996<sup>[10]</sup> and later published as a book.<sup>[9]</sup> In a series of expeditions widely covered by mainstream media, a team of marine archaeologists led by [Robert Ballard](#) identified what appeared to be ancient shorelines, freshwater snail shells, drowned river valleys, tool-worked timbers, and man-made structures in roughly 100 metres (330 ft) of water off the Black Sea coast of modern Turkey.<sup>[11][12]</sup>

Black Sea gradual inundation hypothesis

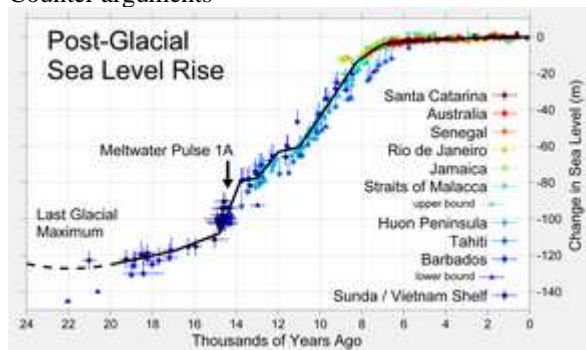
In addition to the early Holocene "Noah's Flood" scenario proposed by Ryan, Pitman, Dimitrov, and their colleagues<sup>[4][8]</sup> and the Caspian Sea overflow scenario of Chepalyga,<sup>[13][14]</sup> the non-catastrophic *progressive flood model* (or *gradual inflow model*) has been proposed to explain the Late Quaternary sea level history of the Black Sea.<sup>[2][15]</sup>

About 8,000 [YBP](#), the level of the [Marmara Sea](#) would have risen high enough for two-way flow to start. The evidence used to support this scenario includes the disparate ages of [sapropel](#) deposition in the eastern Mediterranean Sea and Black Sea; buried back-stepping barrier islands observed on the Black Sea shelf; and an under-water delta in the Marmara Sea, near the Bosporus Strait, composed of Black Sea sediments.<sup>[16][17][18]</sup>

Late Pleistocene Great Flood hypothesis

In 2003 and 2007, a more ancient catastrophic flood scenario was proposed by Andrei L. Chepalyga for the Late Quaternary sea level rise of the Black Sea.<sup>[11][2][13]</sup> The hypothesis for a **Late Pleistocene Great Flood** argues that brackish Neoeuxinian Lake, which occupied the Black Sea basin, was rapidly inundated by glacial meltwater overflow from the [Caspian Sea](#) via the [Manych-Kerch](#) Spillway shortly after the [Late Glacial Maximum](#), about 17,000–14,000 BP. These extensive meltwater flooding events linked several [lacustrine](#) and [marine water](#) bodies, starting with the southern edge of the Scandinavian and southward, through spillways to the Manych-Kerch and Bosphorus, ultimately forming what has been referred to as the Cascade of Eurasian Basins.<sup>[14]</sup> This event is argued to have caused a rapid, if not catastrophic, rise in the level of the Black Sea. It might have imposed substantial stresses upon contemporary human populations and remained in cultural memory as the *Great Flood*. The authors also suggested that the event might have stimulated the beginning of shipping and horse domestication.<sup>[11][14]</sup>

Counter arguments



The Post-Glacial Sea Level.

Criticisms of the deluge hypothesis focus on the magnitude and pace of the water level rise in the Black Sea. With enough moderation of these features, the catastrophe hypothesis is voided. However, a few key points should be noted:

- Since the ending of the [last glacial period](#), the global [sea level has risen](#) some 120 m (390 ft).<sup>[19][20]</sup>
- The flood hypothesis hinges on the [geomorphology](#) of the [Bosporus](#) since the end of the glacial age.<sup>[21]</sup> The Black Sea area has been sealed off and reconnected many times during the last 500,000 years.<sup>[22]</sup>

Opponents of the deluge hypothesis point to clues that water was flowing out of the Black Sea basin as late as 15,000 years ago.<sup>[23]</sup>

In this alternative scenario, much depends on the evolution of the Bosphorus. According to a study from 2001, the modern sill is 32–34 m (105–112 ft) below sea level and consists of Quaternary sand over-lying Paleozoic bedrock in which three sills are found at 80–85 m (260–280 ft) below sea level. [Sedimentation](#) on these sills started before 10,000 years ago and continued until 5,300 years ago.<sup>[24]</sup>

A large part of the academic geological community also continues to reject the idea that there could have been enough sustained long-term pressure by water from the Aegean to dig through a supposed isthmus at the present Bosphorus or enough of a difference in water levels, if at all, between the two water basins.<sup>[25]</sup>

In 2007, a research anthology on the topic was published which makes much of the earlier Russian research available in English for the first time and combines it with more recent scientific findings.<sup>[26]</sup>

According to a 2009 study by [Liviu Giosan](#), Florin Filip, and Ștefan Constatinescu, the level in the Black Sea before the marine reconnection was 30 m (100 ft) below present sea level, rather than the 80 m (260 ft) (or lower) of the catastrophe theories. If the flood occurred at all, the sea level increase and the flooded area during the reconnection were significantly smaller than previously proposed. Since the depth of the Bosphorus, in its middle furrow, at present varies from 36 to 124 m (118 to 407 ft), with an average depth of 65 m (213 ft), a calculated [Stone Age](#) shoreline in the Black Sea lying 30 m (100 ft) lower than in the present day would imply that the contact with the Mediterranean might never have been broken during the [Holocene](#), and hence there could have been no sudden waterfall-style transgression.<sup>[27]</sup> The flooding could have been "not so big".<sup>[28]</sup>

In 2011, several authors concluded that "there is no underwater archaeological evidence to support any catastrophic submergence of prehistoric Black Sea settlements during the late Pleistocene or early Holocene intervals".<sup>[29]</sup>

A 2012 study based on [process](#) length variation of the [dinoflagellate cyst](#) *Lingulodinium machaerophorum* shows no evidence for catastrophic flooding.<sup>[30]</sup> [Geophysical](#), [geochronological](#), and [geochemical](#) evidence points to a "fast transgression" of the submergence lasting between 10 and 200 years.<sup>[31]</sup>

### Black Sea undersea river, Wikipedia<sup>4</sup>

The [Bosphorus Strait](#) can be seen at lower left of this illustration of the Black Sea, from [NASA's World Wind](#) globe software.

The **Black Sea undersea river** is a current of particularly [saline](#) water flowing through the [Bosphorus Strait](#) and along the [seabed](#) of the [Black Sea](#). The discovery of the river, announced on 1 August 2010, was made by scientists at the [University of Leeds](#), and is the first of its kind in the world.<sup>[1]</sup> The undersea river stems from salty water spilling through the Bosphorus Strait from the [Mediterranean Sea](#) into the Black Sea, where the water has a lower salt content.<sup>[1]</sup>

Scientists have previously discovered channels running along ocean floors, based on [sonar](#) scanning. One of the largest of these runs from the mouth of the [Amazon River](#) into the [Atlantic Ocean](#).<sup>[1]</sup> Though it was suspected that these channels might function as rivers, it was only with the discovery of the Black Sea river that this suspicion was confirmed. Because of the power and unpredictability of these streams, they have been difficult to explore directly.<sup>[2]</sup> A team of scientists headed by Jeff Peakall and Daniel Parsons of the University of Leeds collaborated with scientists from the [University of Southampton](#), [Memorial University of Newfoundland](#), and the [Turkish Institute of Marine Sciences](#). The team used the [Natural Environment Research Council's](#) Autosub3 – a 7-metre torpedo-shaped [autonomous underwater vehicle](#) – to get as close to the current as possible.<sup>[2]</sup> The river was found to be 37 miles (60 km) long, up to 115 feet (35 m) deep and 0.6 miles (1 km) wide. Though smaller than the Amazon channel, the undersea river still carried ten times more water than the [Rhine](#). It flows at a speed of four miles per hour (6 km/h), with 22,000 cubic metres (780,000 cu ft) passing through per second. Had it been a surface river it would have ranked as the sixth largest river in the world.<sup>[1]</sup>

The river was found to contain features typical of surface rivers, such as [river banks](#), [floodplains](#), [waterfalls](#) and [rapids](#). One major difference was that the underwater river, when rounding a bend, moved in currents spinning in the opposite direction from those on land.<sup>[1]</sup> The river works as a [density current](#), because it carries [sediments](#) along the sea floor and has a higher [salinity](#) than the surrounding water.<sup>[3]</sup>

### Noah's Ark, Wikipedia<sup>5</sup>

**Noah's Ark** ([Hebrew](#): תיבת נח; [Biblical Hebrew](#): *Tevat Noah*)<sup>[Notes 1]</sup> is the ship in the [Genesis flood narrative](#) through which [God](#) spares [Noah](#), his family, and examples of all the world's animals from a [global deluge](#).<sup>[1]</sup> The story in Genesis is repeated, with variations, in the [Quran](#), where the Ark appears as *Safinat Nūh* ([Arabic](#): سفينة نوح "Noah's ship") and *al-fulk* ([Arabic](#): الفلك).

Early Christian and Jewish writers such as [Flavius Josephus](#) believed that Noah's Ark existed, even though unsuccessful [searches for Noah's Ark](#) have been made from at least the time of [Eusebius](#) (c. 275–339 CE). Believers in the Ark continue to search for it in modern times, but no scientific evidence that the Ark existed has ever been found,<sup>[2]</sup> nor is there scientific evidence for a global flood.<sup>[3]</sup> The ship and natural disaster as described in the Bible would have been contingent upon physical impossibilities and extraordinary anachronisms.<sup>[4]</sup> Some researchers believe that a real (though localized) flood event in the [Middle East](#) could potentially have inspired the oral and later written narratives; a Persian Gulf flood, or a [Black Sea Deluge](#) 7,500 years ago has been proposed as such a historical candidate.<sup>[5][6]</sup>

#### Description

The structure of the Ark (and the chronology of the flood) is homologous with the Jewish Temple and with Temple worship.<sup>[7]</sup> Accordingly, Noah's instructions are given to him by God (Genesis 6:14–16): the ark is to be 300 [cubits](#) long, 50 cubits wide, and 30 cubits high (approximately 134×22×13 m or 440×72×43 ft).<sup>[8]</sup> These dimensions are based on a numerical preoccupation with the number 60, the same number characterizing the vessel of the Babylonian flood hero.<sup>[1]</sup>

Its three internal divisions reflect the three-part universe imagined by the ancient Israelites: heaven, the earth, and the underworld.<sup>[9]</sup> Each deck is the same height as the Temple in Jerusalem, itself a microcosmic model of the universe, and each is three times the area of the court of the tabernacle, leading to the suggestion that the author saw both Ark and [tabernacle](#) as serving for the preservation of human life.<sup>[10][11]</sup> It has a door in the side, and a *tsohar*, which may be either a roof or a [skylight](#).<sup>[8]</sup> It is to be made of [gopher wood](#), a word which appears nowhere else in the Bible – and divided into *qinnim*, a word which always refers to birds' nests elsewhere in the

Bible, leading some scholars to emend this to *qanim*, reeds.<sup>[12]</sup> The finished vessel is to be smeared with *koper*, meaning [pitch](#) or [bitumen](#); in Hebrew the two words are closely related, *kaparta* ("smeared") ... *bakopper*.<sup>[12]</sup>

Origins

### Mesopotamian precursors

For well over a century, scholars have recognized that the Bible's story of Noah's Ark is based on older Mesopotamian models.<sup>[13]</sup> Because all these flood stories deal with events that allegedly happened at the dawn of history, they give the impression that the myths themselves must come from very primitive origins, but the myth of the global flood that destroys all life only begins to appear in the [Old Babylonian period](#) (20th–16th centuries BCE).<sup>[14]</sup> The reasons for this emergence of the typical Mesopotamian flood myth may have been bound up with the specific circumstances of the end of the [Third Dynasty of Ur](#) around 2004 BCE and the restoration of order by the First Dynasty of [Isin](#).<sup>[15]</sup>

Nine versions of the Mesopotamian flood story are known, each more or less adapted from an earlier version. In the oldest version, inscribed in the Sumerian city of [Nippur](#) around 1600 BCE, the hero is King [Ziusudra](#). This story, the [Sumerian flood myth](#), probably derives from an earlier version. The Ziusudra version tells how he builds a boat and rescues life when the gods decide to destroy it. This basic plot is common in several subsequent flood stories and heroes, including Noah. Ziusudra's Sumerian name means "He of long life." In Babylonian versions, his name is [Atrahasis](#), but the meaning is the same. In the Atrahasis version, the flood is a river flood.<sup>[16]:20–27</sup>

The version closest to the biblical story of Noah, as well as its most likely source, is that of [Utnapishtim](#) in the [Epic of Gilgamesh](#).<sup>[17]</sup> A complete text of Utnapishtim's story is a clay tablet dating from the seventh century BCE, but fragments of the story have been found from as far back as the 19th-century BCE.<sup>[17]</sup> The last known version of the Mesopotamian flood story was written in [Greek](#) in the third century BCE by a Babylonian priest named [Berossus](#). From the fragments that survive, it seems little changed from the versions of 2,000 years before.<sup>[18]</sup>

The parallels between Noah's Ark and the arks of Babylonian flood heroes Atrahasis and Utnapishtim have often been noted. Atrahasis' Ark was circular, resembling an enormous [quffa](#), with one or two decks.<sup>[19]</sup> Utnapishtim's ark was a [cube](#) with six decks of seven compartments, each divided into nine subcompartments (63 subcompartments per deck, 378 total). Noah's Ark was rectangular with three decks. A progression is believed to exist from a circular to a cubic or square to rectangular. The most striking similarity is the near-identical deck areas of the three arks: 14,400 cubits<sup>2</sup>, 14,400 cubits<sup>2</sup>, and 15,000 cubits<sup>2</sup> for Atrahasis, Utnapishtim, and Noah, only 4% different. Professor Finkel concluded, "the iconic story of the Flood, Noah, and the Ark as we know it today certainly originated in the landscape of ancient Mesopotamia, modern Iraq."<sup>[20]</sup>

Linguistic parallels between Noah's and Atrahasis' arks have also been noted. The word used for "pitch" (sealing tar or resin) in Genesis is not the normal Hebrew word, but is closely related to the word used in the Babylonian story.<sup>[21]</sup> Likewise, the Hebrew word for "ark" (*tevah*) is nearly identical to the Babylonian word for an oblong boat (*tubbū*), especially given that "v" and "b" are the same letter in Hebrew: [bet](#) (ב).<sup>[20]</sup>

However, the causes for God or the gods sending the flood differ in the various stories. In the Hebrew myth, the flood inflicts God's judgment on wicked humanity. The Babylonian [Epic of Gilgamesh](#) gives no reasons, and the flood appears the result of divine caprice.<sup>[22]</sup> In the Babylonian [Atrahasis](#) version, the flood is sent to reduce human overpopulation, and after the flood, other measures were introduced to limit humanity.<sup>[23][24][25]</sup>

### Composition

A consensus among scholars indicates that the [Torah](#) (the first five books of the Bible, beginning with Genesis) was the product of a long and complicated process that was not completed until after the [Babylonian exile](#).<sup>[26]</sup> Since the 18th century, the flood narrative has been analysed as a paradigm example of the combination of two different versions of a story into a single text, with one marker for the different versions being a consistent preference for different names "Elohim" and "Yahweh" to denote God.<sup>[27]</sup>

Religious views

### Rabbinic Judaism

The [Talmudic tractates Sanhedrin](#), [Avodah Zarah](#), and [Zevahim](#) relate that, while Noah was building the Ark, he attempted to warn his neighbors of the coming deluge, but was ignored or mocked. God placed lions and other ferocious animals to protect Noah and his family from the wicked who tried to keep them from the Ark. According to one [Midrash](#), it was God, or the [angels](#), who gathered the animals and their food to the Ark. As no need existed to distinguish between clean and unclean animals before this time, the clean animals made themselves known by kneeling before Noah as they entered the Ark.<sup>[citation needed]</sup> A differing opinion is that the Ark itself distinguished clean animals from unclean, admitting seven pairs each of the former and one pair each of the latter.<sup>[28][non-primary source needed]</sup>



According to Sanhedrin 108b, Noah was engaged both day and night in feeding and caring for the animals, and did not sleep for the entire year aboard the Ark.<sup>[29]</sup> The animals were the best of their kind and behaved with utmost goodness. They did not procreate, so the number of creatures that disembarked was exactly equal to the number that embarked. The raven created problems, refusing to leave the Ark when Noah sent it forth, and accusing the patriarch of wishing to destroy its race, but as the commentators pointed out, God wished to save the raven, for its descendants were destined to feed the prophet [Elijah](#).<sup>[28]</sup><sup>[non-primary source needed]</sup>

According to one tradition, refuse was stored on the lowest of the Ark's three decks, humans and clean beasts on the second, and the unclean animals and birds on the top; a differing interpretation described the refuse as being stored on the topmost deck, from where it was shoveled into the sea through a trapdoor. Precious stones, as bright as the noon sun, provided light, and God ensured the food remained fresh.<sup>[30][31][32]</sup> In an unorthodox interpretation, the 12th-century Jewish commentator [Abraham ibn Ezra](#) interpreted the ark as a vessel that remained under water for 40 days, after which it floated to the surface.<sup>[33]</sup>

### Christianity

The [First Epistle of Peter](#) (composed around the end of the first century AD<sup>[34]</sup>) compared Noah's salvation through water to Christian salvation through baptism.<sup>[35]</sup> [Hippolytus of Rome](#) (died 235) sought to demonstrate that "the Ark was a symbol of the [Christ](#) who was expected", stating that the vessel had its door on the east side—the direction from which Christ would appear at the [Second Coming](#)—and that the bones of [Adam](#) were brought aboard, together with gold, [frankincense](#), and [myrrh](#) (the symbols of the [Nativity of Christ](#)). Hippolytus furthermore stated that the Ark floated to and fro in the four directions on the waters, making the sign of the cross, before eventually landing on Mount Kardu "in the east, in the land of the sons of Raban, and the Orientals call it Mount Godash; the [Armenians](#) call it Ararat".<sup>[36]</sup> On a more practical plane, Hippolytus explained that the lowest of the three decks was for wild beasts, the middle for birds and domestic animals, and the top for humans. He says male animals were separated from females by sharp stakes to prevent breeding.<sup>[36]</sup>

The early [Church Father](#) and theologian [Origen](#) (circa 182–251), in response to a critic who doubted that the Ark could contain all the animals in the world, argued that Moses, the traditional author of the book of Genesis, had been brought up in [Egypt](#) and would therefore have used the larger Egyptian cubit. He also fixed the shape of the Ark as a truncated [pyramid](#), square at its base, and tapering to a square peak one cubit on a side; only in the 12th century did it come to be thought of as a rectangular box with a sloping roof.<sup>[37]</sup>

Early Christian artists depicted Noah standing in a small box on the waves, symbolizing God saving the Christian Church in its turbulent early years. [Augustine of Hippo](#) (354–430), in his work [City of God](#), demonstrated that the dimensions of the Ark corresponded to the dimensions of the human body, which according to Christian doctrine is the body of Christ and in turn the body of the Church.<sup>[38]</sup> [Jerome](#) (circa 347–420) identified the raven, which was sent forth and did not return, as the "foul bird of wickedness" expelled by [baptism](#);<sup>[39]</sup> more enduringly, the dove and olive branch came to symbolize the [Holy Spirit](#) and the hope of [salvation](#) and eventually, peace.<sup>[40]</sup> The olive branch remains a secular and religious [symbol of peace](#) today.

### Gnosticism

According to the [Hypostasis of the Archons](#), a 3rd century [Gnostic](#) writing, Noah is chosen to be spared by the evil [Archons](#) when they try to destroy the other inhabitants of the Earth with the great flood. He is told to create the ark then board it at a location called Mount Sir, but when his wife [Norea](#) wants to board it as well, Noah attempts to not let her. So, she decides to use her divine power to blow upon the ark and set it ablaze, therefore Noah is forced to rebuild it.<sup>[41]</sup>

### Islam

In contrast to the Jewish tradition, which uses a term that can be translated as a "box" or "[chest](#)" to describe the Ark, surah 29:15 of the Quran refers to it as a *safina*, an ordinary ship; surah 7:64 uses *fulk*,<sup>[42][43]</sup> and surah 54:13 describes the Ark as "a thing of boards and nails". [Abd Allah ibn Abbas](#), a contemporary of [Muhammad](#), wrote that Noah was in doubt as to what shape to make the Ark and that Allah revealed to him that it was to be shaped like a bird's belly and fashioned of [teak](#) wood.<sup>[44]</sup>

[Abdallah ibn 'Umar al-Baidawi](#), writing in the 13th century, explains that in the first of its three levels, wild and domesticated animals were lodged, in the second human beings, and the third birds. On every plank was the name of a prophet. Three missing planks, symbolizing three prophets, were brought from [Egypt](#) by [Og](#), son of [Anak](#), the only one of the [giants](#) permitted to survive the flood. The body of [Adam](#) was carried in the middle to divide the men from the women. Surah 11:41 says: "And he said, 'Ride ye in it; in the Name of Allah it moves and stays!'" ; this was taken to mean that Noah said, "[In the Name of Allah!](#)" when he wished the Ark to move, and the same when he wished it to stand still.<sup>[citation needed]</sup>

The medieval scholar [Abu al-Hasan Ali ibn al-Husayn Masudi](#) (died 956) wrote that Allah commanded the Earth to absorb the water, and certain portions which were slow in obeying received [salt water](#) in punishment and so became [dry and arid](#). The water which was not absorbed formed the seas, so that the waters of the flood still exist. Masudi says the ark began its voyage at [Kufa](#) in central [Iraq](#) and sailed to [Mecca](#), circling the [Kaaba](#) before finally traveling to [Mount Judi](#), which surah 11:44 gives as its final resting place. This mountain is identified by tradition with a hill near the town of [Jazirat ibn Umar](#) on the east bank of the [Tigris](#) in the province of [Mosul](#) in northern Iraq, and Masudi says that the spot could be seen in his time.<sup>[30][31]<sup>[</sup>*better source needed*]</sup>

### **Bahá'í Faith**

The [Bahá'í Faith](#) regards the Ark and the Flood as symbolic.<sup>[45]</sup> In Bahá'í belief, only Noah's followers were spiritually alive, preserved in the "ark" of his teachings, as others were spiritually dead.<sup>[46][47]</sup> The Bahá'í scripture [Kitáb-i-Íqán](#) endorses the Islamic belief that Noah had numerous companions on the ark, either 40 or 72, as well as his family, and that he taught for 950 (symbolic) years before the flood.<sup>[48]</sup> The Bahá'í Faith was founded in 19th century Persia, and it recognizes divine messengers from both the Abrahamic and the Indian traditions.

### **Ancient accounts**

Multiple Jewish and Christian writers in the ancient world wrote about the ark. The first-century historian [Josephus](#) reports that the Armenians believed that the remains of the Ark lay "in Armenia, at the mountain of the Cordyaeans", in a location they called the Place of Descent ([Ancient Greek](#): αποβατηριον). He goes on to say that many other writers of "barbarian histories", including [Nicolaus of Damascus](#), [Berossus](#), and [Mnaseas](#) mention the flood and the Ark.<sup>[49]</sup>

In the fourth century, [Epiphanius of Salamis](#) wrote about Noah's Ark in his [Panarion](#), saying "Thus even today the remains of Noah's ark are still shown in Cardyaei."<sup>[50]</sup> Other translations render "Cardyaei" as "the country of the Kurds".<sup>[51]</sup>

[John Chrysostom](#) mentioned Noah's Ark in one of his sermons in the fourth century, saying "'Do not the mountains of Armenia testify to it, where the Ark rested? And are not the remains of the Ark preserved there to this very day for our admonition?"<sup>[52]</sup>

### **Historicity**

[The first edition of the Encyclopædia Britannica](#) from 1771 describes the Ark as factual. It also attempts to explain how the Ark could house all living animal types: "... Buteo and [Kircher](#) have proved geometrically, that, taking the common [cubit](#) as a foot and a half, the ark was abundantly sufficient for all the animals supposed to be lodged in it ... the number of species of animals will be found much less than is generally imagined, not amounting to a hundred species of [quadrupeds](#)."<sup>[53]</sup> It also endorses a supernatural explanation for the flood, stating that "many attempts have been made to account for the deluge by means of natural causes: but these attempts have only tended to discredit philosophy, and to render their authors ridiculous".<sup>[54]</sup>

The 1860 edition attempts to solve the problem of the Ark being unable to house all animal types by suggesting a local flood, which is described in the 1910 edition as part of a "gradual surrender of attempts to square scientific facts with a literal interpretation of the Bible" that resulted in "the [higher criticism](#)' and the rise of the modern scientific views as to the origin of species" leading to "scientific comparative mythology" as the frame in which Noah's Ark was interpreted by 1875.<sup>[53]</sup>

### **Ark's geometry**

In Europe, the [Renaissance](#) saw much speculation on the nature of the Ark that might have seemed familiar to early theologians such as [Origen](#) and [Augustine](#). At the same time, however, a new class of scholarship arose, one which, while never questioning the literal truth of the ark story, began to speculate on the practical workings of Noah's vessel from within a purely naturalistic framework. In the 15th century, Alfonso Tostada gave a detailed account of the logistics of the Ark, down to arrangements for the disposal of dung and the circulation of fresh air. The 16th-century [geometer Johannes Buteo](#) calculated the ship's internal dimensions, allowing room for Noah's grinding mills and smokeless ovens, a model widely adopted by other commentators.<sup>[40]</sup>

[Irving Finkel](#), a curator at the British Museum, came into the possession of a [cuneiform](#) tablet. He translated it and discovered a hitherto unknown Babylonian version of the story of the great flood. This version gave specific measurements for an unusually large [coracle](#) (a type of rounded boat). His discovery led to the production of a television documentary and a book summarizing the finding. A scale replica of the boat described by the tablet was built and floated in Kerala, India.<sup>[56]</sup>

### **Searches for Noah's Ark**

[Searches for Noah's Ark](#) have been made from at least the time of [Eusebius](#) (c.275–339 CE) to the present day.<sup>[57]</sup> In the 1st century, Jewish historian [Flavius Josephus](#) claimed the remaining pieces of Noah's Ark had been

found in Armenia, at the mountain of the Cordyaeans, which is nowadays Mount Ararat in Turkey.<sup>[58]</sup> Today, the practice is widely regarded as [pseudarchaeology](#).<sup>[57][2][59]</sup> Various locations for the ark have been suggested but have never been confirmed.<sup>[60][61]</sup> Search sites have included [Durupınar site](#), a site on [Mount Tendürek](#) in eastern [Turkey](#) and [Mount Ararat](#), but geological investigation of possible remains of the ark has only shown natural sedimentary formations.<sup>[62]</sup> While biblical literalists maintain the Ark's existence in archaeological history, much of its scientific feasibility along with that of the deluge has been contested.<sup>[63][64]</sup>

Cultural legacy: Noah's Ark replicas

In the modern era, individuals and organizations have sought to reconstruct Noah's ark using the dimensions specified in the Bible.<sup>[65]</sup> [Johan's Ark](#) was completed in 2012 to this end, while the [Ark Encounter](#) was finished in 2016.<sup>[66]</sup>

## Outburst flood, Wikipedia<sup>6</sup>

In [geomorphology](#), an **outburst flood**—a type of **megaflood**—is a high-magnitude, low-frequency catastrophic [flood](#) involving the sudden release of a large quantity of water.<sup>[1][2]</sup> During the last [deglaciation](#), numerous [glacial lake outburst floods](#) were caused by the collapse of either ice sheets or glaciers that formed the dams of [proglacial lakes](#). Examples of older outburst floods are known from the geological past of the Earth and inferred from geomorphological evidence on [Mars](#). [Landslides](#), [lahars](#), and [volcanic dams](#) can also block rivers and create lakes, which trigger such floods when the rock or earthen barrier collapses or is eroded. Lakes also form behind glacial moraines or ice dams, which can collapse and create outburst floods.<sup>[3][4]</sup>

Definition and classification

Megafloods are [paleofloods](#) (past floods) that involved rates of water flow larger than those in the historical record. They are studied through the [sedimentary deposits](#) and the erosional and constructional [landforms](#) that individual megafloods have created. Floods that are known to us through historical descriptions are mostly related to meteorological events, such as heavy rains, rapid melting of snowpacks, or combination of these. In the geological past of the Earth, however, geological research has shown that much larger events have occurred.<sup>[3]</sup> In the case of outburst floods, such floods are typically linked to the collapse of a barrier which formed a lake. They fall in the following classification according to the mechanism responsible:

- Collapse of glacier dams that impound proglacial lakes ([Missoula Floods](#)).
- Rapid erosion, melting of ice sheets ([jökulhlaups](#)).
- Collapse of earthen barriers (landslides or glacial moraines).
- Collapse of [volcanic dams](#) created by lava flows, lahars, or pyroclastic flows.
- Overtopping of earthen or rock barriers
  - Lake overtopping (e.g., [Lake Bonneville](#)).
  - Ocean spilling over a dividing ridge into a [landlocked basin](#) (e.g., [Zanclean flood](#) and [Black Sea flood](#)).<sup>[1]</sup> A smaller scale example would be the [Pantai Remis landslide](#).

### Examples

**Examples where evidence for large ancient water flows has been documented or is under scrutiny include:**  
**Overflow of lakes formed by landslides**

An example is the lake overflow that caused one of the worst landslide-related disasters in history on June 10, 1786. A landslide dam on Sichuan's [Dadu River](#), created by an earthquake ten days earlier, burst and caused a flood that extended 1,400 km (870 mi) downstream and killed 100,000 people.<sup>[5]</sup>

### Postglacial rebound

[Postglacial rebound](#) changes the tilt of ground. In lakes, this means that shores sink in the direction farther away from the former maximum depth of ice. When the lake rests against an [esker](#), water pressure increases with the increased depth. The esker may then fail under the load and burst, creating a new outflow. [Lake Pielinen](#) in Finland is an example of this.

### Tectonic basins

#### The Black Sea (around 7,600 years ago)

A rising sea flood, the proposed and much-discussed refilling of the freshwater glacial [Black Sea](#) with water from the [Aegean](#), has been described as "a violent rush of salt water into a depressed fresh-water lake in a single catastrophe that has been the inspiration for the flood mythology" (Ryan and Pitman, 1998). The marine incursion, caused by the rising level of the Mediterranean, apparently occurred around 7,600 years ago. It remains an active subject of debate among geologists, with subsequent evidence discovered to both support and refute the existence of the flood, while the theory that it is the basis of later [flood myths](#) is not proven.

### **Persian Gulf Flood (24,000 to 14,000 years ago, or 12000 to 10000 years ago)**

Flooding of this area scattered peoples to both sides of the gulf depression. It was an area fed by four rivers. Rose calls it the "Gulf Oasis" which may have been a demographic refuge fed by the Tigris, Euphrates, Karun, and Wadi Batin rivers. It was suggested to be an area of freshwater springs and rivers.<sup>[6][7]</sup>

### **Glacial floods in North America (8,000 to 15,000 years ago)**

In [North America](#), during glacial maximum, there were no [Great Lakes](#) as we know them, but "proglacial" (ice-frontage) lakes formed and shifted. They lay in the areas of the modern lakes, but their drainage sometimes passed south, into the Mississippi system; sometimes into the Arctic, or east into the Atlantic. The most famous of these proglacial lakes was [Lake Agassiz](#). As ice-dam configurations failed, a series of great floods were released from Lake Agassiz, resulting in massive pulses of freshwater added to the world's oceans.

The [Missoula Floods](#) of [Oregon](#) and [Washington states](#) were also caused by breaking ice dams, resulting in the [Channeled Scablands](#).

[Lake Bonneville](#), a [pluvial lake](#), burst catastrophically in the [Bonneville Flood](#) about 14,500 years ago, due to its water overflowing and washing away a sill composed of two opposing [alluvial fans](#) which had blocked a [gorge](#). Lake Bonneville was not a glacial lake, but glacial age climate change determined the lake level and its overflow. The first scientific report of a megaflood (Gilbert, 1890) describes this event.<sup>[8]</sup>

The last of the North American proglacial lakes, north of the present Great Lakes, has been designated [Glacial Lake Ojibway](#) by geologists. It reached its largest volume around 8,500 years ago, when joined with Lake Agassiz. But its outlet was blocked by the great wall of the glaciers and it drained by tributaries, into the [Ottawa](#) and [St. Lawrence Rivers](#) far to the south. About 8,300 to 7,700 years ago, the melting ice dam over [Hudson Bay](#)'s southernmost extension narrowed to the point where pressure and its buoyancy lifted it free, and the ice-dam failed catastrophically. Lake Ojibway's beach terraces show that it was 250 metres (820 ft) above sea level. The volume of Lake Ojibway is commonly estimated to have been about 163,000 km<sup>3</sup> (39,000 cu mi), more than enough water to cover a flattened-out Antarctica with a sheet of water 10 metres (33 ft) deep. That volume was added to the world's oceans in a matter of months.

The detailed timing and rates of change after the onset of melting of the great ice-sheets are subjects of continuing study.

### **The Caspian and Black Seas (around 16,000 years ago)**

A theory proposed by Andrey Tchepalyga of the [Russian Academy of Sciences](#) dates the flooding of the Black Sea basin to an earlier time and from a different cause. According to Tchepalyga, [global warming](#) beginning from about 16,000 BP caused the melting of the [Scandinavia Ice Sheet](#), resulting in massive river discharge that flowed into the [Caspian Sea](#), raising it to as much as 50 metres (160 ft) above normal present-day levels. The [Sea of Azov](#) rose so high that it overflowed into the Caspian Sea.<sup>[dubious – discuss]</sup> The rise was extremely rapid and the Caspian basin could not contain all the floodwater, which flowed from the northwest coastline of the Caspian Sea, through the [Kuma-Manych Depression](#) and [Kerch Strait](#) into the Black Sea basin. By the end of the Pleistocene this would have raised the level of the Black Sea by some 60 to 70 metres (200 to 230 ft) 20 metres (66 ft) below its present-day level, flooding large areas that were formerly available for settlement or hunting. Tchepalyga suggests this may have formed the basis for legends of the great [Deluge](#).<sup>[9]</sup>

### **Red Sea floods**

The barrier across [Bab-el-Mandeb](#), between Ethiopia and Yemen, seems to have been the source of outbreak flooding similar to that found in the Mediterranean. The [Lake Toba](#) event, approximately between 69,000 and 77,000 years ago, caused a massive drop in sea levels<sup>[citation needed]</sup>, exposing the barrier and enabling modern *Homo sapiens* to leave Africa via a route other than Sinai. The finding of saline [evaporites](#) on the floor of the Red Sea confirms that this dam has functioned at various periods in the past. Rising sea levels during the [Flandrian transgression](#) (and in earlier [interglacial](#) periods) suggest that this area may have been subject to outburst flooding.<sup>[10]</sup>

### **English Channel floods**

Originally there was an isthmus across the [Strait of Dover](#). During an earlier glacial maximum, the exit from the [North Sea](#) was blocked to the north by an [ice dam](#), and the water flowing out of rivers backed up into a vast lake with freshwater glacial melt on the bed of what is now the North Sea. A gently upfolding chalk ridge linking the [Weald of Kent](#) and [Artois](#), perhaps some 30 metres (100 feet) higher than the current sea level, contained the [glacial lake](#) at the [Strait of Dover](#). At some time, probably around 425,000 years ago and again around 225,000 years later the barrier failed<sup>[11]</sup> or was overtopped, losing a catastrophic flood that permanently diverted the [Rhine](#) into the English Channel and replacing the "Isthmus of Dover" [watershed](#) by a much lower watershed running from [East Anglia](#) east then southeast to the [Hook of Holland](#) and (as at modern sea level) separated



Britain from the continent of Europe; a [sonar](#) study of the sea bed of the English Channel published in *Nature*, July 2007,<sup>[12]</sup> revealed the discovery of unmistakable marks of a megaflood on the English Channel seabed: deeply eroded channels and braided features have left the remnants of streamlined islands among deeply gouged channels where the collapse occurred.<sup>[13][11]</sup>

#### The refilling of the Mediterranean Sea (5.3 million years ago)

A catastrophic flood refilled the Mediterranean Sea 5.3 million years ago, at the beginning of the [Zanclean](#) age that ended the [Messinian salinity crisis](#).<sup>[14]</sup> The flood occurred when Atlantic waters found their way through the [Strait of Gibraltar](#) into the desiccated [Mediterranean basin](#), following the Messinian salinity crisis during which it repeatedly became dry and re-flooded, dated by consensus to before the emergence of modern humans.<sup>[15]</sup> The Mediterranean did not dry out during the most recent [glacial maximum](#). Sea level during glacial periods within the Pleistocene is estimated to have dropped only about 110 to 120 metres (361 to 394 ft).<sup>[16][17]</sup> In contrast, the depth of the [Strait of Gibraltar](#) where the Atlantic Ocean enters ranges between 300 and 900 metres (980 and 2,950 ft).<sup>[18]</sup>

### Flood myth, Wikipedia<sup>7</sup>

A **flood myth** or a **deluge myth** is a **myth** in which a great **flood**, usually sent by a **deity** or deities, destroys **civilization**, often in an act of **divine retribution**. Parallels are often drawn between the flood waters of these **myths** and the **primaeval waters** which appear in certain **creation myths**, as the flood waters are described as a measure for the **cleansing** of humanity, in preparation for **rebirth**. Most flood myths also contain a **culture hero**, who "represents the human craving for life".<sup>[1]</sup>

The **flood-myth motif** occurs in many cultures, including the *manvantara-sandhya* in **Hinduism**, **Deucalion** and **Pyrrha** in **Greek mythology**, the **Genesis flood narrative**, the **Mesopotamian** flood stories, and the **Cheyenne** flood story.

#### Mythologies

One example of a flood myth is the *Epic of Gilgamesh*. Many scholars believe that this account was copied from the **Akkadian *Atra-Hasis***,<sup>[a]</sup> which dates to the 18th century BCE.<sup>[3][b]</sup> In the **Gilgamesh flood myth**, the highest god, **Enlil**, decides to destroy the world with a flood because humans have become too noisy. The god **Ea**, who had created humans out of clay and divine blood, secretly warns the hero **Utnapishtim** of the impending flood and gives him detailed instructions for building a boat so that life may survive.<sup>[5][6]</sup> Both the *Epic of Gilgamesh* and *Atra-Hasis* are preceded by the similar **Sumerian creation myth** (c. 1600 BCE)<sup>[7]</sup>—the oldest surviving example of such a flood-myth narrative, known from tablets found in the ruins of **Nippur** in the late 1890s and translated by assyriologist **Arno Poebel**.<sup>[8]</sup>

Academic Yi Samuel Chen<sup>[9]</sup> analyzed various texts from the **Early Dynastic III Period** through to the Old Babylonian Period, and argues that the flood narrative was only added in texts written during the **Old Babylonian Period**. With regard to the **Sumerian King List**, observations by experts have always indicated that the portion of the Sumerian King List talking about before the flood differs stylistically from the King List Proper. Essentially Old Babylonian copies tend to represent a tradition of before the flood apart from the actual King List, whereas the **Ur III** copy of the King List and the duplicate from the Brockmon collection indicate that the King List Proper once existed independent of mention of the flood and the tradition of before the flood. Essentially, Chen gives evidence to prove that the section of before the flood and references to the flood in the Sumerian King List were all later additions added in during the Old Babylonian Period, as the Sumerian King List went through updates and edits. The flood as a watershed in early history of the world was probably a new historiographical concept emerging in the Mesopotamian literary traditions during the Old Babylonian Period, as evident by the fact that the flood motif did not show up in the Ur III copy and that earliest chronographical sources related to the flood show up in the Old Babylonian Period. Chen also concludes that the name of "**Ziusudra**" as a flood hero and the idea of the flood hinted at by that name in the Old Babylonian Version of "**Instructions of Shuruppak**" are only developments during that Old Babylonian Period, when also the didactic text was updated with information from the burgeoning Antediluvian Tradition.<sup>[10]</sup>

In **Hindu mythology**, texts such as the **Satapatha Brahmana**<sup>[11]</sup> (c. 6th century BCE)<sup>[12]</sup> and the **Puranas** contain the story of a great flood, "*manvantara-sandhya*",<sup>[13][14]</sup> wherein the **Matsya Avatar** of the **Vishnu** warns the first man, **Manu**, of the impending flood, and also advises him to build a giant boat.<sup>[15][16][17]</sup> In **Zoroastrian Mazdaism**, **Ahriman** tries to destroy the world with a drought, which **Mithra** ends by shooting an arrow into a rock, from which a flood springs; one man survives in an ark with his cattle.<sup>[18]</sup> Norbert Oettinger<sup>[who?]</sup> argues that the story of **Yima** and the Vara<sup>[clarification needed]</sup> was originally a flood myth, and the harsh

winter was added in due to the dry nature of Eastern Iran, as flood myths did not have as much of an effect as harsh winters. He has argued that the mention of melted water flowing in [Videvdad 2.24](#) is a remnant of the flood myth, and mentions that the Indian flood myths originally had their protagonist as Yama, but it was changed to Manu later.<sup>[19]</sup>

In [Plato's \*Timaeus\*](#), written c. 360 BCE, [Timaeus](#) describes a flood myth similar to the earlier versions. In it, the [Bronze race of humans](#) angers the high god [Zeus](#) with their constant warring. Zeus decides to punish humanity with a flood. The Titan [Prometheus](#), who had created humans from clay, tells the secret plan to [Deucalion](#), advising him to build an ark in order to be saved. After nine nights and days, the water starts receding and the park lands on a mountain.<sup>[20]</sup>

The [Cheyenne](#), a North American [Great Plains](#) tribe, believe in a flood which altered the course of their history, perhaps occurring in the [Missouri River Valley](#).<sup>[21]</sup>

### Historicity

Floods in the wake of the [Last Glacial Period](#) (c. 115,000 – c. 11,700 years ago) are speculated to have inspired myths that survive to this day.<sup>[22]</sup> Plato's allegory of [Atlantis](#) is set over 9,000 years before his time, leading some scholars to suggest that a [Stone Age](#) society which lived close to the [Mediterranean Sea](#) could have been wiped out by the rising [sea level](#), an event which could have served as the basis for the story.<sup>[23]</sup>

Archaeologist Bruce Masse stated that some of the narratives of a great flood discovered in many cultures around the world may be linked to an oceanic asteroid impact that occurred between Africa and [Antarctica](#), around the time of a [solar eclipse](#), that caused a [tsunami](#).<sup>[24]</sup> Among the 175 myths he analyzed were a Hindu myth speaking of an alignment of the five planets at the time, and a Chinese story linking the flood to the end of the reign of Empress [Nu Wa](#), indications that point to the date May 10, 2807 BC.<sup>[25]</sup> His hypothesis suggests that a [meteor](#) or [comet](#) crashed into the [Indian Ocean](#) around 3000–2800 BCE, which created the 30-kilometre (19 mi) undersea [Burckle Crater](#) and [Fenambosy Chevron](#), and generated a giant tsunami that flooded coastal lands.<sup>[26]</sup>

### Mesopotamia

[Mesopotamia](#), like other early sites of [riverine civilisation](#), was flood-prone; and for those experiencing valley-wide inundations, flooding could destroy the whole of their known world.<sup>[27]</sup> According to the excavation report of the 1930s excavation at [Shuruppak](#) (modern Tell Fara, Iraq), the [Jemdet Nasr](#) and [Early Dynastic](#) layers at the site were separated by a layer of sand and silt that was interpreted as a flood layer. However, more recently it has been suggested that the nature of this deposit is more like that being created by [river avulsion](#), a process that was very common in the [Tigris–Euphrates river system](#). Similar layers have been recorded at other sites as well, all dating to different periods, which would be consistent with the nature of river avulsions.<sup>[28]</sup>

The geography of the Mesopotamian area changed considerably with the filling of the [Persian Gulf](#) after sea waters rose following the last glacial period. Global sea levels were about 120 m (390 ft) lower around 18,000 BP and rose until 8,000 BP when they reached current levels, which are now an average 40 m (130 ft) above the floor of the Gulf, which was a huge (800 km × 200 km, 500 mi × 120 mi) low-lying and fertile region in Mesopotamia, in which human habitation is thought to have been strong around the [Gulf Oasis](#) for 100,000 years. A sudden increase in settlements above the present-day water level is recorded at around 7,500 BP.<sup>[29][30]</sup>

### Mediterranean Basin

The historian [Adrienne Mayor](#) theorizes that global flood stories may have been inspired by ancient observations of seashells and fish fossils in inland and mountain areas. The ancient Greeks, Egyptians, and Romans all documented the discovery of such remains in such locations; the Greeks hypothesized that Earth had been covered by water on several occasions, citing the seashells and fish fossils found on mountain tops as evidence of this idea.<sup>[31]</sup>

Speculation regarding the [Deucalion](#) myth has postulated a large tsunami in the Mediterranean Sea, caused by the [Thera eruption](#) (with an approximate geological date of 1630–1600 BCE), as the myth's historical basis. Although the tsunami hit the South [Aegean Sea](#) and [Crete](#), it did not affect cities in the mainland of Greece, such as [Mycenae](#), [Athens](#), and [Thebes](#), which continued to prosper, indicating that it had a local rather than a region-wide effect.<sup>[32]</sup>

### Black Sea deluge hypothesis

The [Black Sea deluge hypothesis](#) offers a controversial account of long-term flooding; the hypothesis argues for a catastrophic irruption of water about 5600 BCE from the Mediterranean Sea into the [Black Sea](#) basin. This has become the subject of considerable discussion.<sup>[33][34]</sup> The [Younger Dryas impact hypothesis](#) offers another proposed natural explanation for flood myths; this idea is similarly controversial.<sup>[35]</sup>

## Comets

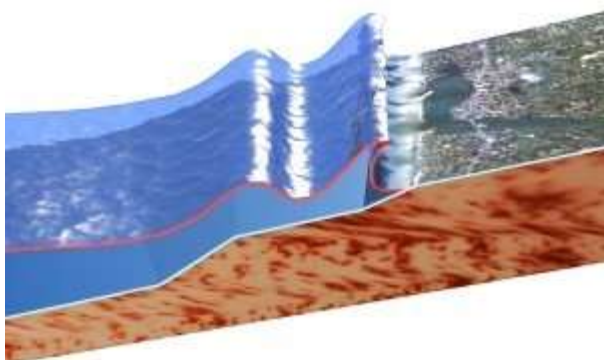
The earliest known hypothesis about a comet that had a widespread effect on human populations can be attributed to [Edmond Halley](#), who in 1694 suggested that a [worldwide flood](#) had been the result of a near-miss by a comet.<sup>[37][38]</sup> The issue was taken up in more detail by [William Whiston](#), a protégé of and popularizer of the theories of [Isaac Newton](#), who argued in his book *A New Theory of the Earth* (1696) that a comet encounter was the probable cause of the Biblical Flood of [Noah](#) in 2342 BCE.<sup>[39]</sup> Whiston also attributed the origins of the atmosphere and other significant changes in the Earth to the effects of comets.<sup>[40]</sup>

In [Pierre-Simon Laplace](#)'s book *Exposition Du Système Du Monde* (*The System of the World*), first published in 1796, he stated:<sup>[41]</sup>

[T]he greater part of men and animals drowned in a universal deluge, or destroyed by the violence of the shock given to the terrestrial globe; whole species destroyed; all the monuments of human industry reversed: such are the disasters which a shock of a comet would produce.<sup>[42][43]</sup>

A similar hypothesis was popularized by Minnesota congressman and [pseudoarchaeology](#) writer [Ignatius L. Donnelly](#) in his book *Ragnarok: The Age of Fire and Gravel* (1883), which followed his better-known book *Atlantis: The Antediluvian World* (1882). In *Ragnarok*, Donnelly argued that an enormous comet struck the Earth around 6,000 BCE to 9,000 BCE,<sup>[c]</sup> destroying an advanced civilization on the "lost continent" of [Atlantis](#). Donnelly, following others before him, attributed the Biblical Flood to this event, which he hypothesized had also resulted in catastrophic fires and [climate change](#). Shortly after the publication of *Ragnarok*, one commenter noted, "Whiston ascertained that the deluge of Noah came from a comet's tail; but Donnelly has outdone Whiston, for he has shown that our planet has suffered not only from a cometary flood, but from cometary fire, and a cometary rain of stones."<sup>[46]</sup>

## List of tsunamis, Wikipedia<sup>8</sup>



### A tsunami hitting a coastline

This article lists notable [tsunamis](#), which are sorted by the date and location that they occurred.

Because of [seismic](#) and [volcanic](#) activity associated with [tectonic plate boundaries](#) along the [Pacific Ring of Fire](#), tsunamis occur most frequently in the Pacific Ocean,<sup>[1]</sup> but are a worldwide [natural phenomenon](#). They are possible wherever large bodies of water are found, including inland lakes, where they can be caused by landslides and [glacier calving](#). Very small tsunamis, non-destructive and undetectable without specialized equipment, occur frequently as a result of minor earthquakes and other events.

Around 1600 [BC](#), a tsunami caused by [the eruption](#) of [Thira](#) devastated the [Minoan civilization](#) on [Crete](#) and related cultures in the [Cyclades](#), as well as in areas on the Greek mainland facing the eruption, such as the [Argolid](#). The oldest recorded tsunami [occurred in 479 BC](#). It destroyed a [Persian](#) army that was attacking the town of [Potidaea](#) in Greece.<sup>[2]</sup>

As early as 426 BC, the [Greek](#) historian [Thucydides](#) inquired in his book *History of the Peloponnesian War* (3.89.1–6) about the causes of tsunamis. He argued that such events could only be explained as a consequence of ocean earthquakes, and could see no other possible causes.<sup>[3]</sup>

Prehistoric

Year	Location	Main Article	Primary Cause	Description
≈1.4 Ma	<a href="#">Molokai, Hawaii</a>	<a href="#">East Molokai Volcano</a>	Landslide	One-third of the East Molokai volcano collapsed into the Pacific Ocean, generating a tsunami with an estimated local height of 2,000 feet (610 m). The wave traveled as far as <a href="#">California</a> and Mexico. <sup>[41][5][6]</sup>
≈9.91–9.29 ka	<a href="#">Dor, Israel</a>		Unknown	A mega-tsunami had a run of at least 16 metres (52 ft) and traveled between 1.5 and 3.5 km (0.9 and 2.2 mi) inland from the ancient <a href="#">Eastern Mediterranean</a> coast. <sup>[7]</sup>
≈7000–6000 BCE	<a href="#">Lisbon, Portugal</a>		Unknown	A series of giant rocks and cobblestones have been found 14 metres (46 ft) above mean sea level near <a href="#">Guincho Beach</a> . <sup>[8]</sup>
≈6225–6170 BCE	Norwegian Sea	<a href="#">Storegga Slide</a>	Landslide	The Storegga Slides, 100 kilometres (62 mi) northwest of the coast of <a href="#">Møre</a> in the <a href="#">Norwegian Sea</a> , triggered a large tsunami in the <a href="#">North Atlantic Ocean</a> . The collapse involved around 290 kilometres (180 mi) of coastal shelf, and a total volume of 3,500 km <sup>3</sup> (840 cu mi) of debris. <sup>[9]</sup> Based on <a href="#">carbon dating</a> of plant material in the sediment deposited by the tsunami, the latest incident occurred around 6225–6170 BC. <sup>[10][11]</sup> In Scotland, traces of the tsunami have been found in sediments from <a href="#">Montrose Basin</a> , the <a href="#">Firth of Forth</a> , up to 80 kilometres (50 mi) inland and 4 metres (13 ft) above current normal tide levels.
5,500 BP	<a href="#">Northern Isles, Scotland</a>	<a href="#">Garth tsunami</a>	Unknown	The tsunami may have been responsible for contemporary <a href="#">mass burials</a> . <sup>[12]</sup>
≈1600 BCE	Santorini, Greece	<a href="#">Minoan eruption</a>	Volcanic eruption	The volcanic eruption in Santorini, Greece is supposed to have caused serious damage to the cities around it, most notably the <a href="#">Minoan civilization</a> on <a href="#">Crete</a> . A tsunami is supposed to be the factor that caused the most damage.

#### Highest or tallest

- The tsunami with the highest runup was the [1958 Lituya Bay megatsunami](#), which had a record height of 524 m (1,719 ft).
- The only other *recent* megatsunamis are the [1963 Vajont Dam megatsunami](#), which had an initial height of 250 m (820 ft), the [1980 Spirit Lake megatsunami](#), which measured 260 m (850 ft) tall, and the 2015 megatsunami in Taan Fiord, a finger of [Icy Bay](#) in [Alaska](#), which had an estimated initial height of 100 metres (328 ft) and a run-up of 193 metres (633 ft).
- A tsunami caused by a landslide during the [1964 Alaska earthquake](#) reached a height of 70 m (230 ft), making it one of the largest tsunamis in recorded history.<sup>[14]</sup>

#### Deadliest

The deadliest tsunami in recorded history was the [2004 Indian Ocean tsunami](#), which killed almost 230,000 people in fourteen countries including (listed in order of confirmed fatalities) Indonesia, [Sri Lanka](#), India, Thailand, [Somalia](#), [Myanmar](#), [Maldives](#), Malaysia, [Tanzania](#), [Seychelles](#), [Bangladesh](#), South Africa, [Yemen](#) and [Kenya](#).<sup>[142]</sup> There were also many injuries and a lot of property damage.

#### Yorum

Sel daima korkulan bir rüyadır. Yerleşim, ekin yetiştirme boyutu ile nehir yatakları uygundur. Etrafa bakarak buraları uygun denilerek yerleşilmiştir.

Endüstri gelmesi ile yataklar yerleşime açılmış ama yağış, sıcak nedeniyle buharlaşma yüksek olunca bir yağmur değil, kovadan boşalmış gibi olarak evleri götürmüştür.

Sel daima çekinilen boyut iken, barajlar ile daha güvenli hale gelinmiştir.

Artık yağmur değil, yüksek buharlaşma nedeni ile bulutun soğuğa çarpması ile yerel bir su boşalması olacak, birden su içinde kalınacaktır. Bunlar bir doğal boyutlardır.

Tsunami de bir doğal, boyuttur, İsrail’de gözlemlendiği söylenen, Hz. Musa zamanındaki Kızıl Deniz yarılması olabilir diye düşünülmüştür.



## Sonuç

Göç bir yaşam hakkı olduğuna göre, bunun zorunlu olduğu bir gerçekliktir.

Buzulların erimesi ile 110-120 ve Akdeniz'de 360 metre deniz seviyesi yükselmiş, boğazlar açılmış ve Karadeniz artık göl denilmemektedir.

Konu ile ilgili destanlar, dini hikayeler olduğu açıktır. Bunların bilim ile bütünleştiği tanımlanmaya çalışılmıştır.

Evet buzulların erimesi ile su seviyesi, deniz yükselmiştir, ayrıca Tsunami ile de denizler, birçok medeniyeti yok etmiştir.

Bize düşen doğayı bilimsel açıdan tanımlamak ve gereken tedbir ve önlemi almaktır. Yoksa sonuç göç etmek olacaktır.

## Kaynaklar

- 1) Last Glacial Maximum. Wikipedia
- 2) Zanclean flood, Wikipedia
- 3) Black Sea deluge hypothesis, Wikipedia
- 4) Black Sea undersea river, Wikipedia
- 5) Noah's Ark, Wikipedia
- 6) Outburst flood, Wikipedia
- 7) Flood myth, Wikipedia
- 8) List of tsunamis, Wikipedia