

called subduction zones, melts and is turned back into magma. One example of an area with continual formation of new sea floor is Gakkel Ridge in the Arctic. This is a submarine mountain range with its northerly extension reaching from the north-eastern tip of Greenland to the Siberian Laptev Sea. In this region, the Eurasian and North American plates drift apart several millimetres every year. Scientists aboard the research icebreaker 'Polarstern' have been investigating this ridge system. They study the consequences of mechanisms contributing to the process of spreading: volcanism, black smokers and lava flow.

3000m altitude. Despite excellent preparation, the expedition is ill-fated. Unfavourable ice conditions at the coast delay the start of the expedition, the equipment does not meet expectations, and, in addition, bad weather complicates the supply of station 'Centre Ice'. The return trip from one of these supply forays, started in November 1930, turns out to be Wegener's doom. In May of 1931, a search expedition finds his dead body, bedded on reindeer skin and covered with sleeping bags. Wegener's companion Rasmus Villumsen is not found despite intense searches. He remains missing and with him the expedition logs from this part of the expedition.

### The legacy

The AWI looks after an Alfred Wegener archive. It contains the works of Alfred Wegener, as well as his biographies. In addition, the Wegener family has bequeathed to the AWI certificates and documents concerning Alfred Wegener's life. The inheritances of two other Greenland expedition participants, Johannes Georgi – leader of station 'Centre Ice', and Fritz Loewe who accompanied Wegener to station 'Centre Ice' – comprise the main contribution to the archive.

The archive continues to be extended through purchases and donations.



▲ The grave of Alfred L. Wegener

### Research today: Greenland

The Greenland inland ice sheet stores information about climate and environmental conditions of our planet over the past 200 to 250,000 years. Findings from this archive may help in studying and understanding changes in climate over long time periods, and assist in estimating the consequences of human impacts on the global climate system. Following the tradition of scientific studies by Alfred Wegener, scientists of the Alfred Wegener Institute investigate the ice in the centre of Greenland in international cooperative teams. The 'Greenland Icecore Project' (GRIP) deciphers the climate archive in ice cores from the 3200m summit down to the rocky ground below. The analysis of the ice will produce a picture of the composition of the atmosphere over the last 200 to 250,000 years and will allow exploration of its direct relationship with climate indicators, such as temperature and precipitation.



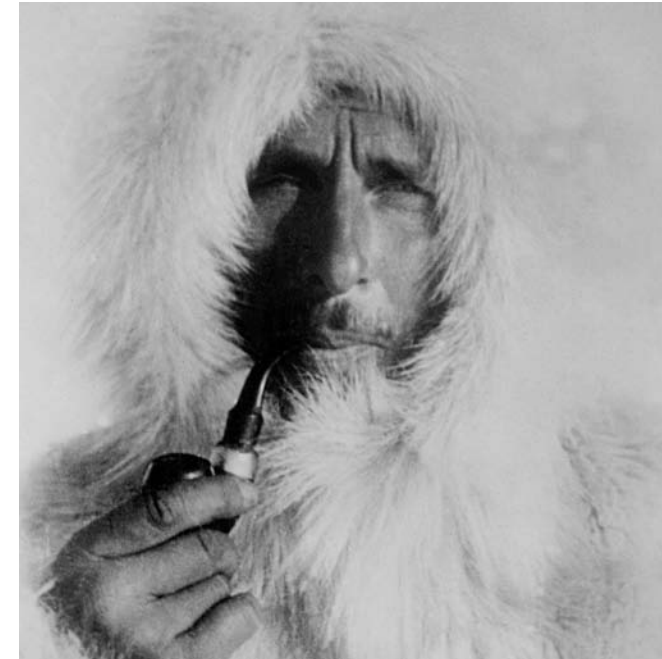
▲ Station 'Centre Ice'

Title photo: Alfred L. Wegener ►

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## Alfred Wegener

### Polar researcher (1880 – 1930)

Alfred-Wegener-Institut  
für Polar- und Meeresforschung  
in der Helmholtz-Gemeinschaft  
Institute for Polar and  
Marine Research

## Alfred Wegener

### Polar researcher

The polar researcher Alfred L. Wegener (1880 – 1930) was as much at home in a variety of scientific fields as on the inland ice of Greenland, or aboard a weather balloon. At the institute named after him in Bremerhaven, scientists currently study the polar regions and the oceans of our planet. In this enterprise, Wegener's insights and his interdisciplinary way of thinking continue to provide direction today.



### Exploration of the sky

Wegener grows up in Berlin and studies astronomy and mathematics. After completion of his doctoral dissertation, he works initially as astronomer, but becomes increasingly interested in the exploration of the atmosphere. For this purpose, he uses kite and balloon sensors to make measurements at great altitudes. From 1906 to 1908, Wegener participates as meteorologist on his first Greenland expedition. Upon his return, he habilitates in meteorology and astronomy at the University of Marburg. The investi-

gation of the atmosphere and of ice masses (glaciology) are specialised developing research fields during Wegener's time, and he also shapes these disciplines. His publications on continental drift revolutionise the geosciences. Many geologists and geophysicists consider Wegener as a cross-disciplinary newcomer with exotic ideas.

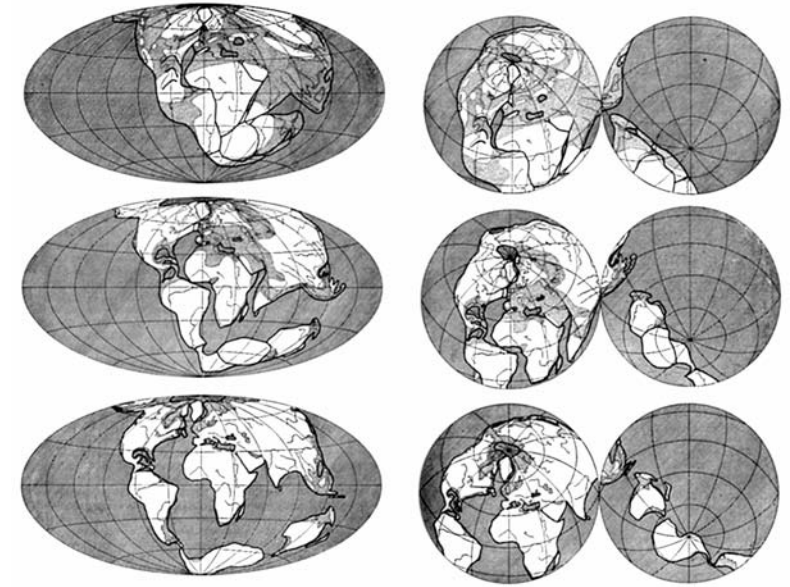
### Floating continents

'Does not the East coast of South America exactly fit the West coast of Africa, as if they were once connected?' This idea of Wegener's, which he first mentions in a private letter in December 1910, is not new. Up to that point, science has had no explanation and treats it as coincidental. Wegener, however, continues to pursue the idea. He proposes the existence of a unified original continent 'Pangea' in the early history of the earth. He suggests that Pangea's breaking fragments have moved away from one another over millions of years by floating on the earth's mantle. On January 6, 1912, Wegener, for the first time, publicly presents his theory of continental drift for discussion to the 'Geologische Vereinigung' at the Senckenberg Museum in Frankfurt. His book, 'The origin of continents and oceans' is published in 1915 while WWI is still ongoing. However, only the 3rd edition from 1922, translated into several languages, is taken note of internationally - often with animosity and ridicule. During an international symposium in New York in 1926, specially dedicated to the topic, the theory of continental drift finds few supporters. This is because geologists of the time are convinced of one thing: that the continents are not able to move relative to one another.

### Seafloor spreading

Wegener's ideas are acknowledged by science only in the mid 1960s, roughly thirty years after his death. Seismic investigations demonstrate that the earth is

covered merely by a thin firm crust, floating on a flexible mantle. Far inside, our planet consists of a very hot core. The earth's crust, where both continents and sea floors are located, consists, geologically, of seven large and numerous small plates (see figure). The plates move - driven by the convection inside the earth's mantle - with a speed of several millimetres to centimetres per year (plate tectonics). The oceans are traversed by so-called oceanic ridges. These are zones where magma from inside the earth rises to the surface, cools off and continually forms new seafloor (see figure). In this process, the existing seafloor spreads and pushes apart the earth's surface, including the continents. At the same time, old seafloor is pushed beneath the surface in so-



▲ Plate tectonics

### Curriculum vitae

Nov. 1, 1880	Alfred Lothar Wegener is born in Berlin as the youngest of five children to theologian and classical linguist Richard Wegener and his wife Anna, née Schwarz
1899	High School graduation ('Abitur') from 'Köllnisches Gymnasium' in Berlin
1899-1904	University Studies of mathematics and natural sciences with emphasis on astronomy in Berlin, Heidelberg and Innsbruck
1904	Doctoral Dissertation: 'Alfonsine tables for application with modern calculators' in Berlin
1902-1903	Astronomer at the public observatory 'Urania' in Berlin
1905-1906	Technical assistant at the aeronautical observatory in Lindenberg, near Berlin
1906-1908	First Greenland expedition ('Danmark Expedition') led by Ludvig Mylius Erichsen
1909-1919	Habilitation in meteorology and astronomy at the University of Marburg
1909-1920	Privatdozent at the Institute of Physics, after 1917 Adjunct Professor
1911	Publication of 'Thermodynamics of the atmosphere' (2nd edition 1924, 3rd edition 1928)
Jan. 6, 1912	First presentation of the theory of continental drift to the 'Geologische Vereinigung' at Senckenberg Museum in Frankfurt/M.
1912	Publication of three research articles about continental drift in the journal 'Petermanns Geographische Mitteilungen'
1912-1913	Second Greenland expedition together with Johan Peter Koch, Lars Larsen and Vigfús Sigurdsson
1914-1918	Military service, initially as infantry soldier in Belgium and France, later as meteorologist within the army's meteorological service
1915	Publication of 'The origin of continents and oceans' (2nd revised edition in 1920)
1919-1924	Division leader at the German hydrographical office 'Deutsche Seewarte', Adjunct Professor at the University of Hamburg
1922	'The origin of continents and oceans' (3rd edition with translations into English, French, Russian, Spanish and Swedish)
1924-1930	Professor of meteorology and geophysics at the University of Graz. Adoption of Austrian citizenship
1926	Austrian member of the 'international society for exploration of the Arctic by means of airship'
1926	Symposium 'Theory of continental drift' in New York
1929	'The origin of continents and oceans' (4th edition), multilingual, revised and significantly extended
1929	Pilot expedition to Greenland
1930-(1931)	'German Greenland expedition Alfred Wegener'
Nov. 1930	Wegener and his companion Villumsen die on the Greenland inland ice
May 1931	Discovery of Wegener's grave. Villumsen remains missing
From 1960	Continental drift is accepted as a reality by the geosciences