Remembering Alfred Wegener (1880 – 1930): Greenlandic and Polar explorer and the father of plate tectonics

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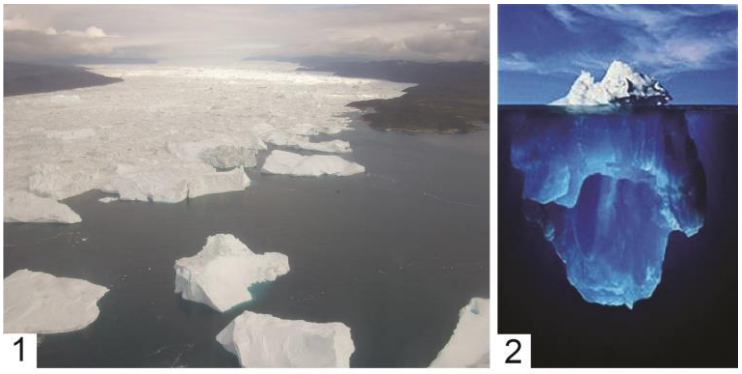
Alfred Wegener (AW) was born in the year 1880 in Berlin and died on the Greenlandic ice-cap in 1930. AW is best remembered as the founder of the plate-tectonics theory which he presented initially in 1912 in front of a sceptical audience in Frankfurt. The audience was mainly hostile because AW was an astronomer and meteorologist – hence a "non-geologist" who had postulated a revolutionary geological theory. It was in 1929 when AW published the fourth and final edition of his book *"Die Entstehung der Kontinente und Ozeane"* (Wegener 1929) shortly before his tragic death caused by exhaustion in central West Greenland on the inland ice in 1930. This contribution aims to synthesise how his four expeditions in Greenland in 1906-1908, 1912/13, 1929 and 1930/31 inspired his revolutionary plate tectonic theory, and to highlight the achievements of AW with respect to the modernisation of geology and polar expeditions. It is likely that during his expeditions AW observed the phenomena of integer ice-masses breaking up in floating fragments (Fig. 1), and the phenomena of icebergs drifting on denser water (Fig. 2). AW proposed that a supercontinent, which he named Pangaea ("all the Earth") broke apart in the early Carboniferous (Wegener 1929, Abb.4) and that light granitic continents float on heavy basaltic continents. AW postulated the idea of a supercontinent and that the consecutive breaking up of it resulted in newly formed drifting continents. AW was one of the first scientists to systematically gather geographical, geological, paleoclimatic, stratigraphic and palaeontological evidence to support his theory (Wegener 1929). It was only in the 1950s that additional evidence, from geomagnetics during oceanic research that discovered the mid-oceanic ridge (McCoy 2006), supported the plate tectonic theory of AW. More modern evidence includes satellite-GPS based measurements of land positions which allowed for the detection of the slow movement of continents (Schwarzbach 1980). Subsequently the plate tectonics theory has been improved as it has been recognized that it is not the continents that float on the ocean floor but that continents and ocean floor form solid plates which move on the asthenosphere. Furthermore research has now informed the community that there are multiple episodes of formation and break-up of supercontinents, such as Pangaea, caused by convection systems in the mantle and now demonstrable by various geophysical techniques. Besides the extraordinary and revolutionary achievements of AW regarding the understanding of the evolution of the earth, AW was also a Greenlandic polar explorer who modernized polar expeditions, with his efforts cumulating in his last expedition to include overwintering on the inland ice and the construction of permanent staffed basecamps in Mid, West and East Greenland. His last expedition was focused on meteorology, investigating the role of the high-pressure system over the Inland Ice in controlling the weather cyclones that travel from Eastern Canada to Western Europe. This became very important e.g. for intercontinental flights and supply of fighter aircraft from North America to Europe during WW2. The focus of the NAC+ conference is the understanding of the mineral resource potential of the North Atlantic Craton and its correlation from Canada through Greenland, Scotland and into Scandinavia – while discussing this topic, we honour the retrospections and achievements of AW, the father of plate tectonics.



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