



Wegener's thinking about the mechanism: Greenland and Iceland

Wolfgang Jacoby

Inst. Earth Sciences, Johannes Gutenberg Universität, Mainz Germany (jacoby@uni-mainz.de)

Wegener's early Arctic expeditions to Greenland (1906-08 and 1912-13 with a stop in Iceland) suggest a significant affect on his thinking about the mechanism of continental drift till his death in 1930. Beside his specialized work in meteorology and the Arctic, he had a broad general interest in science especially of the earth system as a whole. The drift idea occurred to him in 1910 on the basis of new data on geomorphology (Atlantic seafloor), supported by geophysics, geology and palaeontology. In his 1912 initial public talk and ensuing paper he mentioned something akin to seafloor spreading and refuted the continental relict hypothesis from break-up for the mid-Atlantic ridge.

But 1912 he bypassed the tension fractures in Iceland and in Greenland (1912-13) he experienced the rheology of ice, brittle and viscous, when thinking about the drift of SIAL continents through the SIMA mantle (as documented in his diaries). When in 1915 rewriting his 1912 paper as the book "Die Entstehung der Kontinente und Ozeane" he had given up the early idea for that of floating continental rafts. It is tempting to speculate why. Rheology of rocks was clearly described. But some misconceptions distracted him from the correct relationships: (1) Data of the time suggested that sialic rock is more solid than mafic rock which would soften at lower temperature (contrary to present knowledge) and (2) convection in the atmosphere, well known to him, seemed to be no model for convection in the mantle, although rafting continents implied mantle flow. Did the rheologies appear too different to him? Not before the mid twenties (as documented in the 4th edition of his book, 1929) did Wegener admit that mantle convection might be the answer.

A great spirit was misled but clearly saw that the phenomenon of drift, based on observations, is not refuted by the lack of an explanation.