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Continental drift of the rotation pole: observation, theory and application

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The Earth rotation pole moves with respect to the crust. Along with a nearly seasonal wobble of about 0.2" and other sub-seasonal oscillations of smaller amplitude, it also a low frequency motion with time scale beyond 10 years. According to astro-geodetic observations going back to 1890, this low frequency motion is mostly a linear function of time at the rate of about 0.4"/century. It is interpreted as the visco-elastic response of the Earth to the last deglaciation, however tectonic processes with mantle downwelling or upwelling could also account for a part of it. In this respect, the linear trend provides constraints on law mantle viscosity. A wobble of about 0.01" with periods between 10 years and 40 years is observed around this drift. Whereas the Markowitz term in about 30 years is still a mystery, the oscillation at 10 year time scale mostly reflects climatic changes through variation in the continental ice coverage. After a synthesis of both observations and theoretical models at stake, we highlight the interest of low frequency pole in astro-geodetic processing.