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Solid-Earth Processes and Secular Geocenter Motion

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In this talk, we will discuss the glacial isostatic adjustment (GIA) contribution to the geocenter motion (GCM) which is presently assumed to be the largest contribution to the secular motion of the center of mass of the Earth against the center of figure of the Earth.

The predicted GIA contribution ranges by one order in amplitude from 0.1 to 1.0 mm/yr, depending on the considered rheological structure of the earth's mantle, but is quite robustly directed towards Laurentide pointing inward. It means that in spite of the amplitude of the GIA-induced GCM its direction is predicted quite accurately. In comparison to observations, the amplitude of secular GCM is by a factor of 100 smaller than the observed periodic GCM which is mainly induced by surface-mass transport processes. Furthermore, the secular motion is presently determined with an accuracy of $\pm$ 1 mm/yr and, so, an improvement by one order of magnitude is demanded to relate the observations to solid earth processes.

One further aspect which has to be discussed is the integral formulation for the prediction of the GCM opposing the non-uniform station distribution for its observation.