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GIA Ice Models

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Defining the ice load in a way that avoids circularity is perhaps the most difficult aspect of GIA modeling. At any instant of past time the global land-supported ice load must honor the meltwater curve and the known edges of the ice, but within these constraints the ice mass can be swapped to a considerable extent between the various glacial systems and parts of those systems. In our models, ice thickness is controlled by the effective basal shear stress (EBSS). This parameter incorporates the sub-ice lithology (e.g., whether the ice rests on sediment of crystalline rock), the relative local snow accumulation rate, and the local basal shear strength (which presumably depends most strongly on sub-ice temperature). The effective basal shear stress can be fairly easily modified to construct an ice model. The ice model is evaluated by the geological reasonability of its changes in EBSS in space and time, and by how well it matches measured GIA data. The risk that an incorrect earth model can be forced to fit the GIA data by manipulating the ice model (the circularity mentioned above) can be minimized by evaluating the longest wavelength deformations (peripheral bulge behavior) before proceeding to the shorter wavelength deformations (local emergence variations). The poster will describe how we have proceeded in this fashion to develop a framework for interpreting GIA data in Norway. The poster will be augmented by computer software that compares emergence data to models at specific sites in Norway.