



## **Ice deformation measurements in boreholes on Rhonegletscher**

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In order to provide boundary conditions for numerical flow modeling, information on the basal motion of temperate glaciers are necessary. Whereas basal processes are usually not directly accessible and cannot easily be inferred from surface measurements, borehole deformation measurements allow via determination of velocity profiles to investigate the contributions of both sliding and internal ice deformation to surface motion.

In summer 2009 borehole deformation measurements covering both vertical and shear strain have been carried out on the tongue of Rhonegletscher (Valais, Switzerland). Unlike earlier studies using gravitation driven inclinometry uniquely, our experimental setup includes both gravimeters and magnetometers. This allows to determine the borehole deformation with respect to a fixed coordinate system given by gravitational and geomagnetical fields.

Additionally, daily variations of englacial water pressure and borehole tilt angle are considered. The tilt variation are well correlated to the pressure variations. So we conjecture that daily ice flow variations are driven by the influence of changing water pressure on basal motion, in spite of the exact mechanism not being clear yet.