

Local ice stream dynamics inferred from monitoring icequake activity in the eastern Dronning Maud Land, East-Antarctica

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In Antarctica, investigations of the interactions of ice streams (channels of fast moving ice) with the underlying bedrock and coastal ice shelf provide crucial information about the ice sheet dynamics. Shedding new perspectives on glaciology, monitoring cryo-seismic activity is a novel and promising tool. During two summer campaigns of 2014 and 2015 we investigated those interactions in eastern Queen Maud Land using 6 broadband seismic stations in the Sør Rondane Mountains and using collocated 4 to 15 short-period seismic stations and GPS antennas at the two locations of grounding line transition zone. The first experiment shows the most of the recorded seismicity is restricted to the first few km and spatially confined into several few km wide zones correlated with largest ice flow speed and shear strain rate in the vicinity of mountain outcrop suggesting a source origin at the ice-bedrock interface. The second type of experiment conducted on 2 sites near the coast at the transition between the floating ice shelf and the grounded ice shows the existence of tide modulated seismicity correlated with the periodic flexure of the ice shelf. In addition, 2 other types of seismic events are observed and that may be associated with distinct local basal mechanisms. Ongoing analysis of the full dataset would provide information on time dependence of such seismicity.