



Peculiar seismicity in Antarctica: swarms of glacial earthquakes with a recurrent magnitude under David Glacier, Victoria Land

S. Danesi (1), A. Morelli (1), S. Bannister (2)

(1) INGV Bologna, Italy (2) GNS Wellington, New Zealand (danesi@ingv.it / +39065041181)

Antarctic seismicity is little known. It appears to be lower than in the other continents and intra-plate environments, but in fact our knowledge is too scanty to tell us much about the active tectonics. The study of seismicity in such an unusual environment as Antarctica can also reveal the existence of unexpected or little known processes. Here we report on the observation of continuous local seismic activity in the area of the David outlet glacier in Victoria Land. We monitored the area with a temporary local seismographic array, that allowed us to detect more than 6,000 events, most of which originate by ice cracking (and are often dubbed 'icequakes'). Besides, we also recorded and located about 120 low-magnitude events, with distinctly different characteristics, that do not fit either in the descriptions of icequakes, nor of usual earthquakes due to brittle fracture of rock. We interpret them instead as due to stick-slip behaviour at the ice-rock interface, presumably due to a single asperity mostly slipping aseismically and episodically breaking in a brittle failure, perhaps in connection with a small surge in glacier motion. Larger magnitude events, whose signals are recorded at planetary scale, have been reported as due to sudden slip of large ice masses in Greenland and Antarctica. We may be looking here at a smaller-scale instance of the same phenomenon. Further constraints are expected from modelling of fracture dynamics, and from geodetic observation of glacier flow.