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ConCorDia : a new, permanent seismological station in Antarctica

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Concordia (Dome C) is the site of a permanent seismic observatory station, CCD, which has been running since 2005. The station is placed 1 km away from the inhabited part of the base, and consists of a vault at 12 m below snow level and a shelter on the surface. While the acquisition electronics operate at temperate conditions (0-20C) in the shelter, the seismometers are placed in the vault at a stable temperature of -60C, well below design specifications.

Our first policy was to run the seismometers (two Streckeisen STS-2s) at this temperature, because heating induces small variations in temperature that in turn add noise to the seismic signals. This policy led to a first difficulty in re-centering the instruments at temperatures below -45C, resulting in poorly centered seismometers at the steady state temperature of -60C. Secondly, and more importantly, the signal - of good quality during the first few weeks/months - ultimately degraded and became useless (spurious and frequent oscillations and spikes of unknown origin).

As of 2007, we have relaxed our no-heating policy, and are heating one of the two instruments. In order to avoid convection which is the most likely source of temperature perturbation, we installed our heating elements at the top of the volume in order to create a stable stratified temperature gradient. The temperature at the base of the heated STS-2 is now -30C. It seems, from the information we currently have available, that the heated seismometer performs much better. We shall present a more detailed analysis of the data from the heated and unheated systems, based on the complete 2007 dataset.