

## Geomagnetic polar observatories: the role of Concordia station at Dome C, Antarctica

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### Abstract

A geomagnetic observatory is a permanent facility where magnetic declination and inclination are recorded in conjunction with the temporal evolution of the magnetic field components. Polar regions are scarcely covered by observational points then the contributions from observatories located there are particularly relevant. The geomagnetic observatory at Concordia station, Dome C - Antarctica is located in the inner part of the continent, its position is favorable for two key reasons, i) data are unaltered by the "coastal effect" and ii) crustal effect is negligible due to the thickness, almost 3 km, of ice coverage. Nevertheless, these latter conditions imply an unconsidered aspect which characterizes the entire station and every structure laying on the ice surface: the dome on which Concordia station resides is sliding horizontally and moving vertically with a velocity of few millimeter to centimeters per year as indicated by independent geodetic observations. This slow and continuous movement has a puzzling effect on the trend of horizontal components of the magnetic field, sampled in a time window of a decade since the establishing of the observatory in 2005. During the International Polar Year (2007-2009) the observatory was upgraded with new equipment fulfilling the requirements of the Intermagnet consortium, and becoming an observatory member in 2011. In this paper are illustrated the strategy adopted to track any possible displacement of the observatory reference points (i.e. the azimuth mark, the pillar position) and all the ordinary and extraordinary actions required for collecting high quality data.

### Keywords

Geomagnetic observatory; GNSS; Azimuth Mark Determination; Dome C; Concordia; Antarctica

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### References

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