REPORTING QUASI-DEFINITIVE OBSERVATORY DATA IN NEAR REAL TIME

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Driven by the demand from the oil industry for data to aid directional drilling operations, the British Geological Survey (BGS) has undertaken a development programme in geomagnetic observatory instrumentation and data acquisition and processing to enable production of quasi-definitive data from its observatories in near real time. Magnetic observatories have been encouraged to produce baseline corrected data in a continuous manner to facilitate the validation of main-field models and other data products planned for the upcoming Swarm mission. The mission will require data of the type BGS is now providing.
The BGS operates three observatories in the UK and four overseas. At each of the UK observatories three identical systems record the magnetic field direction (1 Hz) and magnitude (0.1 Hz). At the overseas observatories there is a single system with vector and scalar instruments. BGS reports baseline corrected data in near real time, which are rigorously quality controlled. For the UK observatories this involves using comparison plots between systems for each component to identify any corrupt data, which are then corrected using data from an unaffected dataset. In the case of the overseas observatories, total field comparisons assist in identifying any corrupt data, which are removed the following day.
Two absolute observations are made per week at the UK observatories whereas two per month are made at the overseas stations, and additional observations are made during service visits. Baseline functions are updated monthly by fitting piecewise polynomials to these spot values. Daily extrapolated baseline values, derived from the baseline functions, are combined with the variometer data by the automatic data processing software.
The developments in BGS magnetic observatory operations and data processing are described. The results of a study in which we have compared quasi-definitive hourly mean values made available on-line on a next day basis with the definitive published data, not normally available until the following year, are presented. The results show that on average the quasi-definitive data are within 5nT of the definitive values. We compare the results from the UK and overseas observatories and discuss the difficulties in consistently producing accurate quasi-definitive data for the BGS observatories in remote locations. Ideas for making improvements are discussed.

Geomagnetism, Observatories, Quasi-Definitive

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