Observatory data processing operations at the British Geological Survey

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BGS observatory data operations - aims

Deliver data products for scientific and commercial use in real-time

No loss of one-minute data from UK observatories

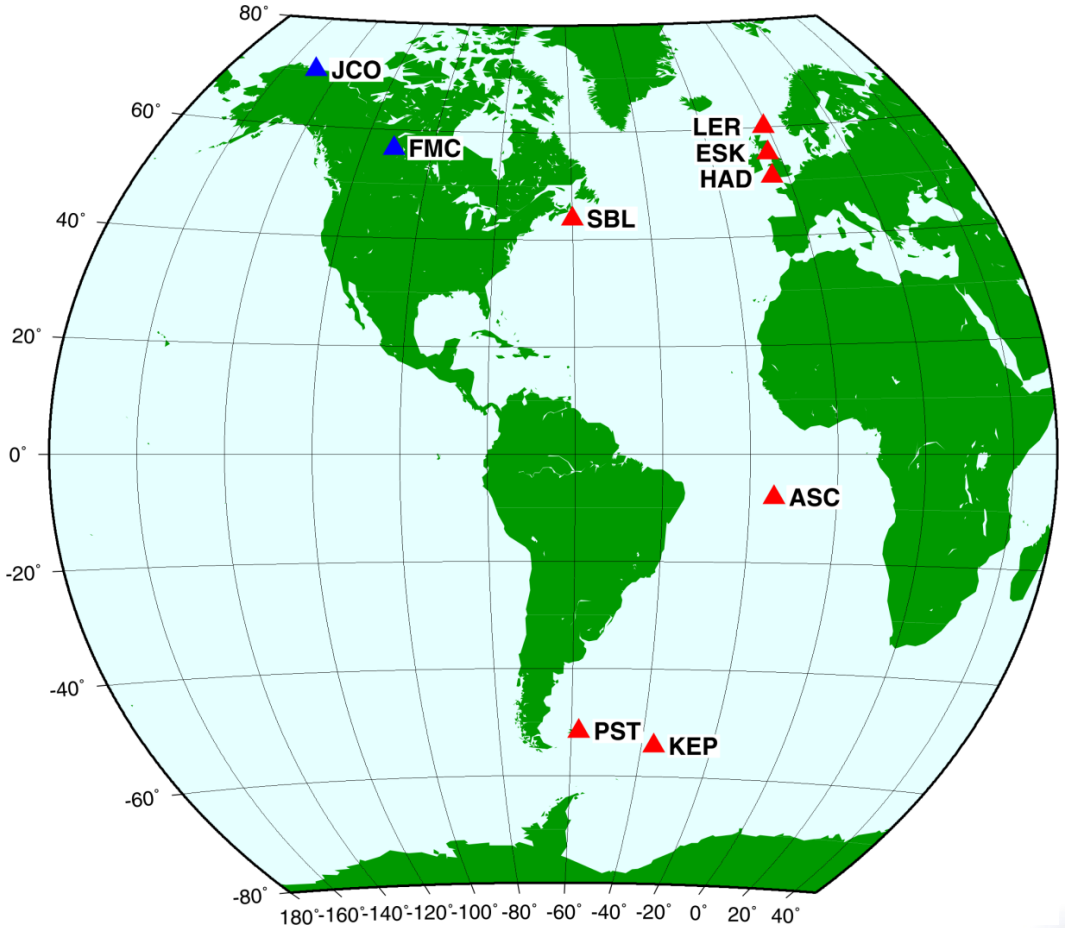
Report quasi-definitive data to INTERMAGNET

Regularly publish preliminary/definitive results

Data Processing Operations

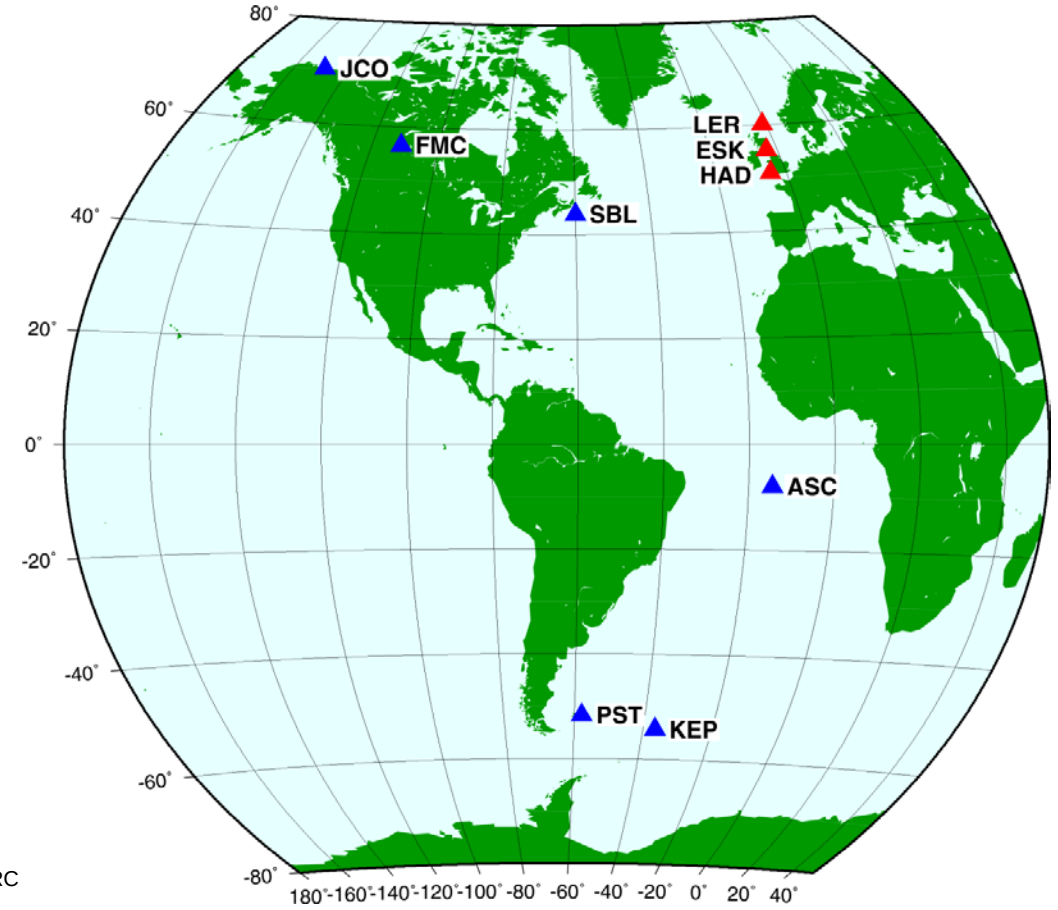
- Operational QC task shared between 4 staff on weekly rotation
- Point of contact for engineers and observatory staff
- Data quality checked and corrected in real-time or next-day basis (Monday-Friday)
- Real-time data processing systems checked for faults and managed during routine downtime

BGS observatories



- BGS Observatories
- Observatories operated with commercial partner

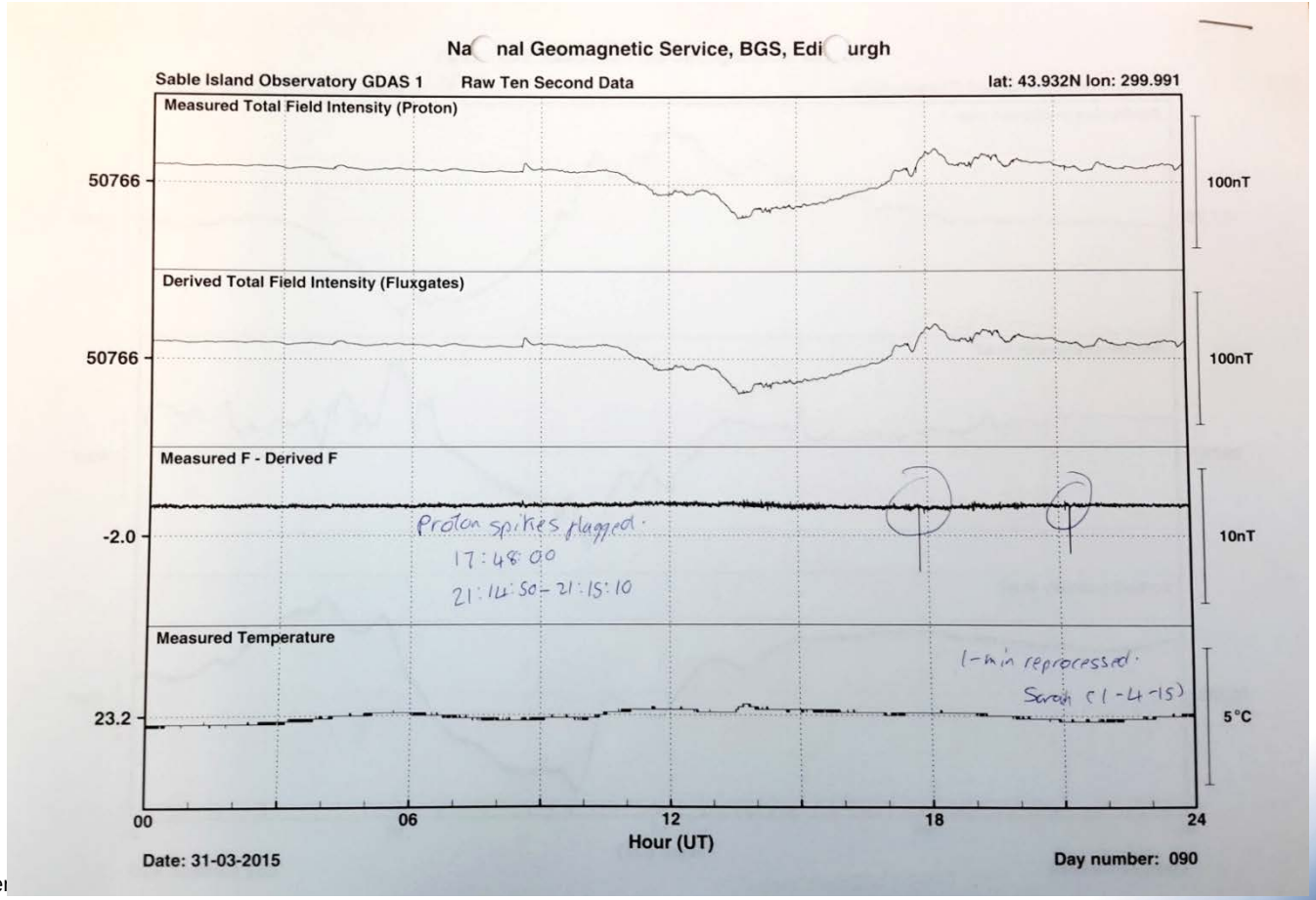
Single vs multi system observatories



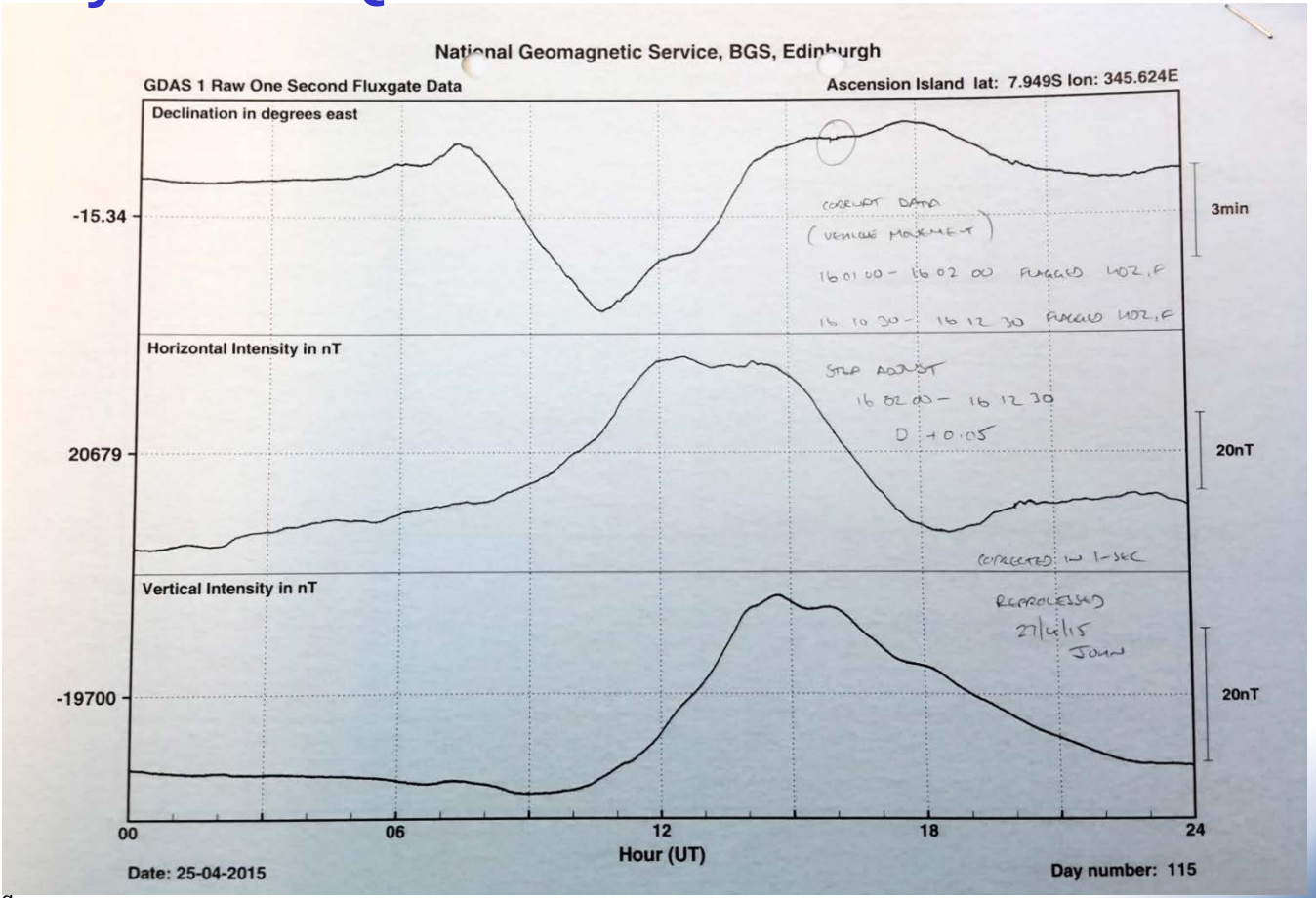
Fluxgate Magnetometer

Proton Precession Magnetometer

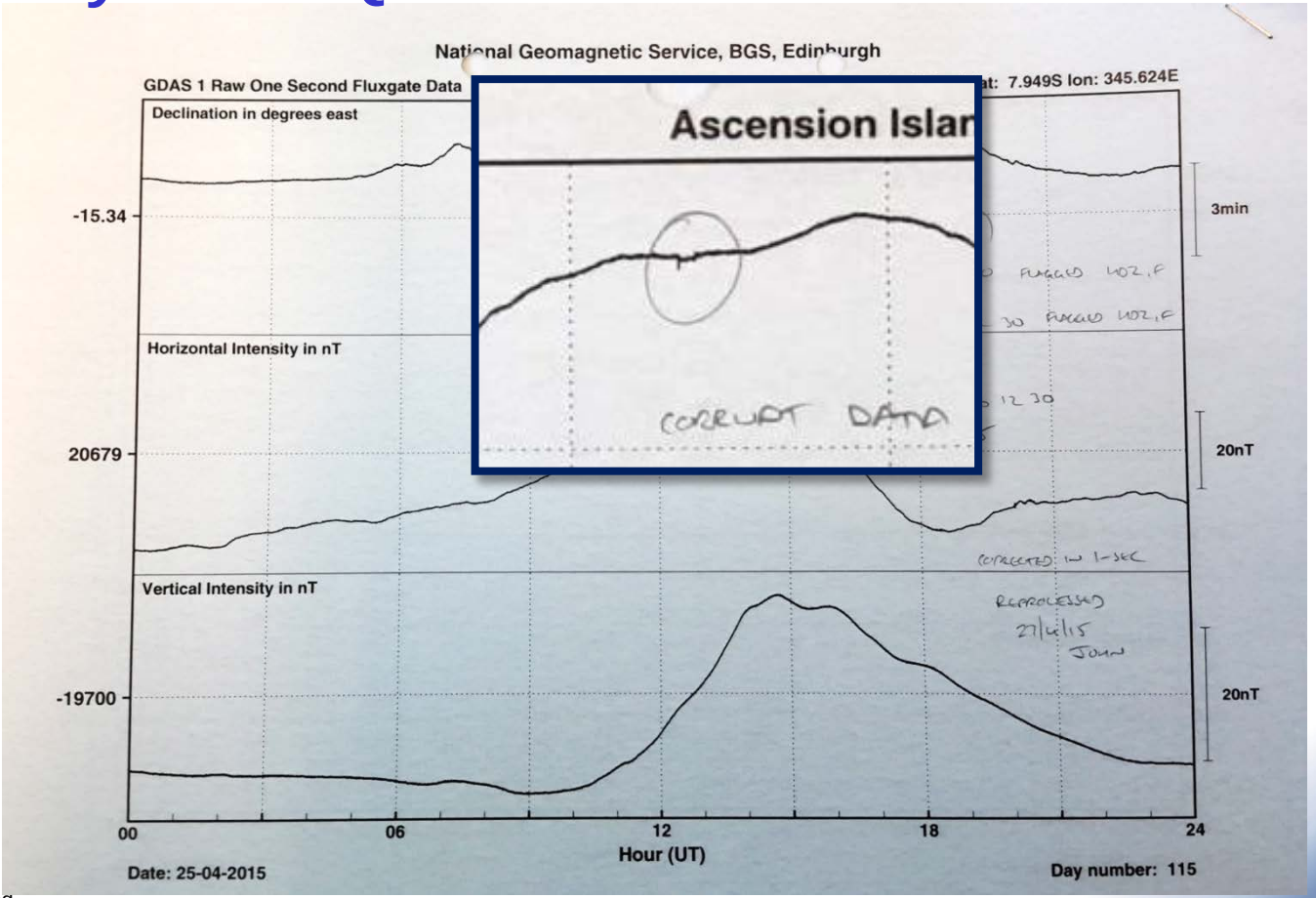
Single system QC – 1-second corrections



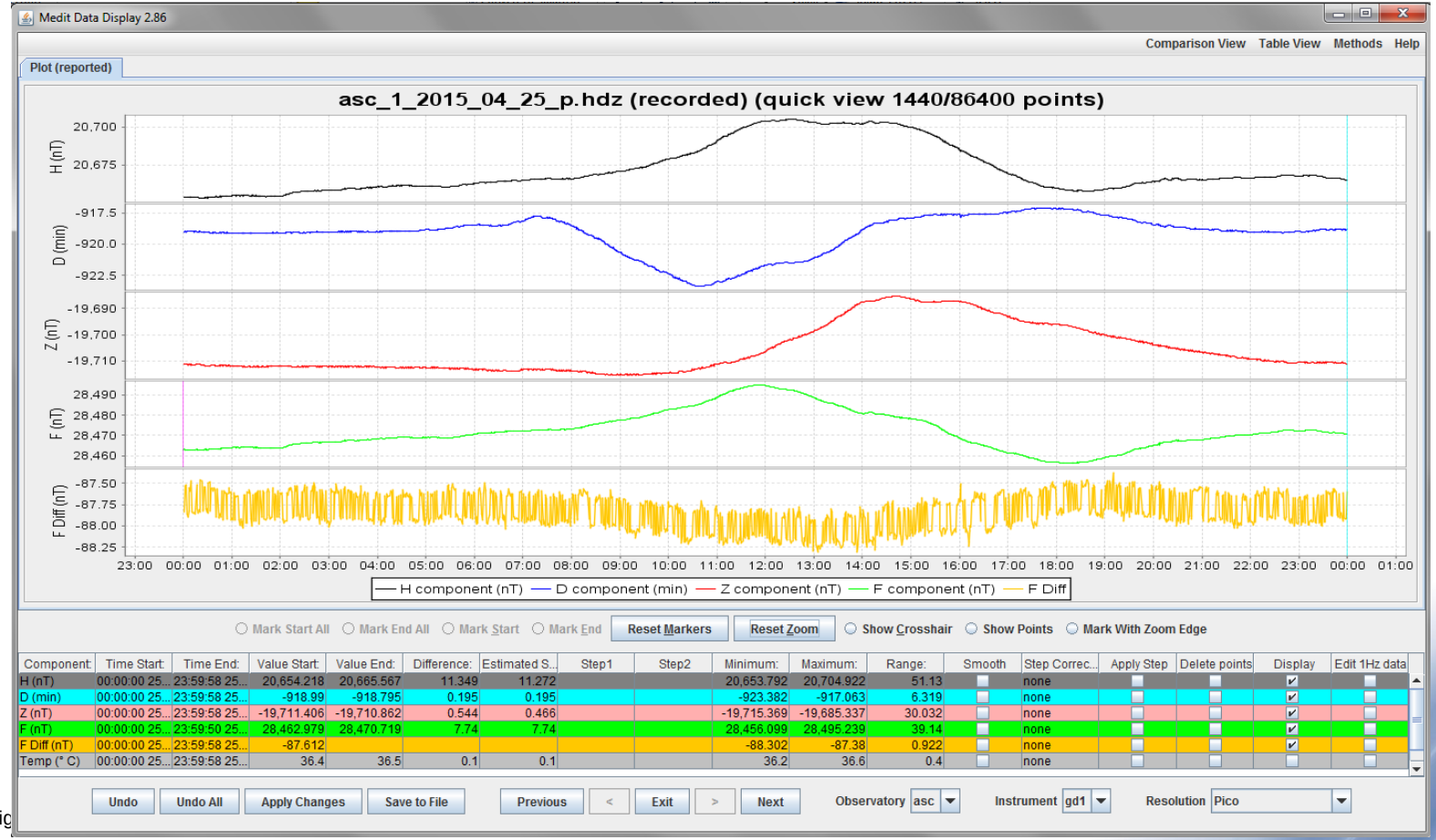
Single system QC – 1-second corrections



Single system QC – 1-second corrections



Medit - data QC software



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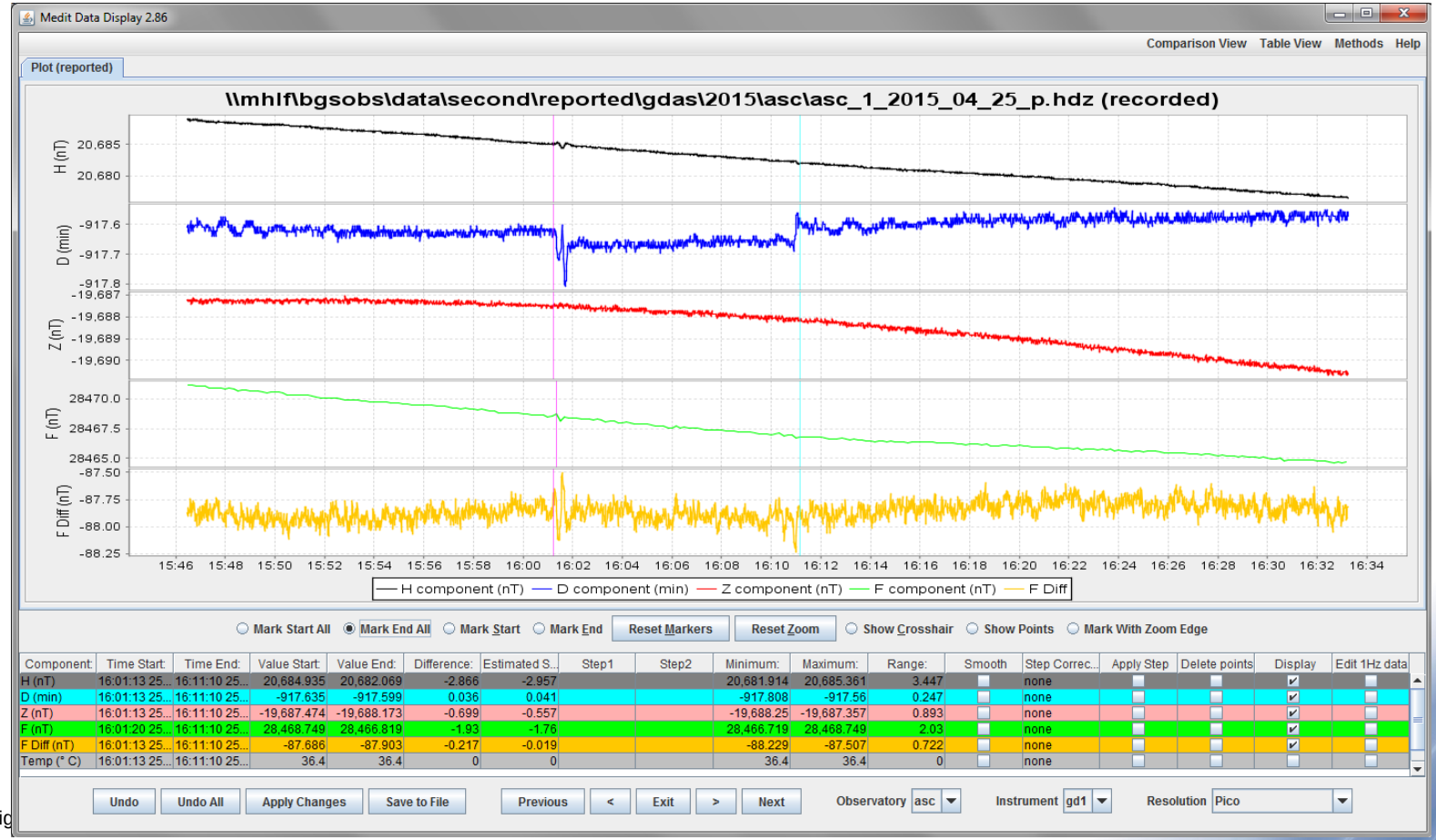

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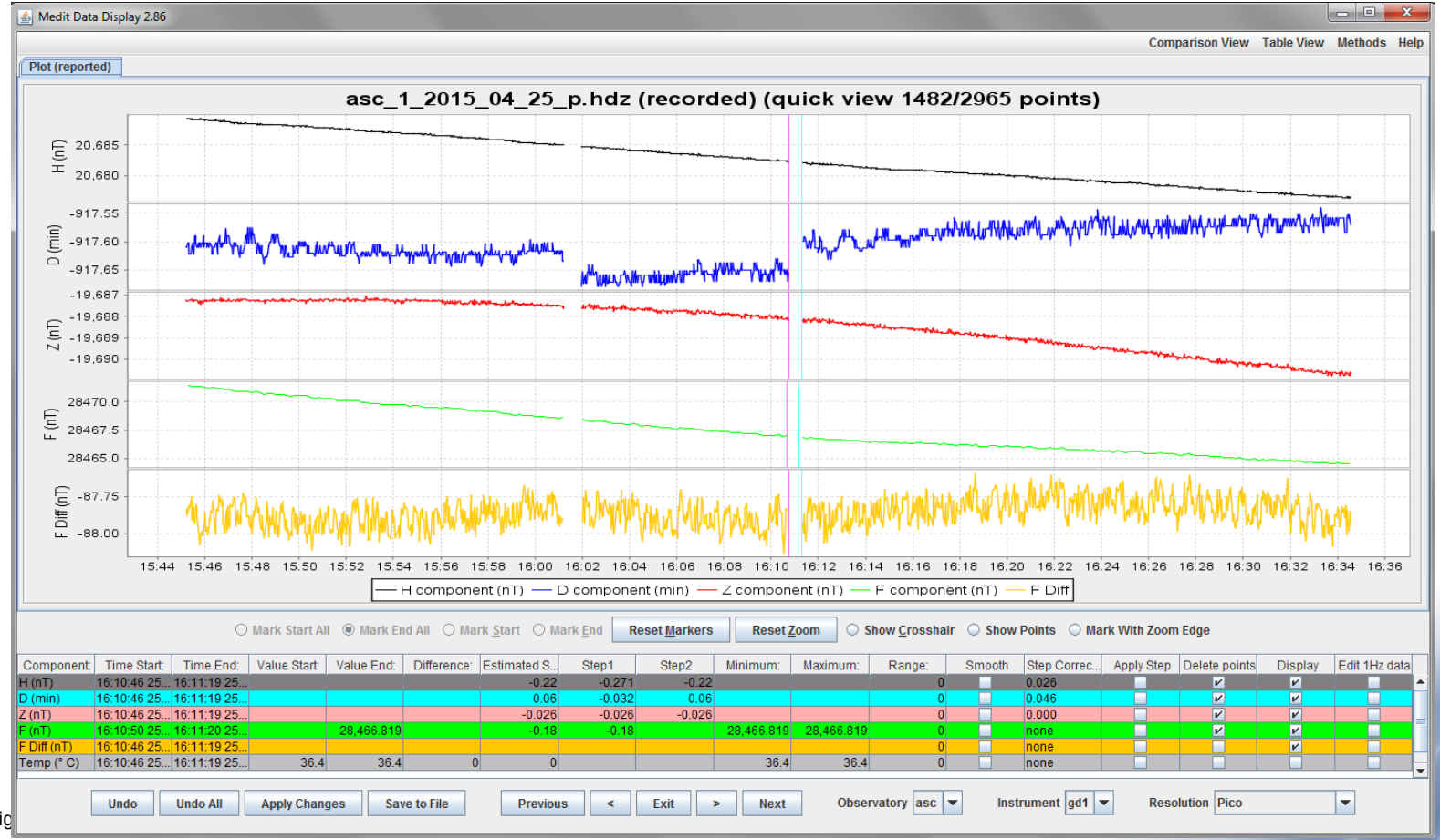

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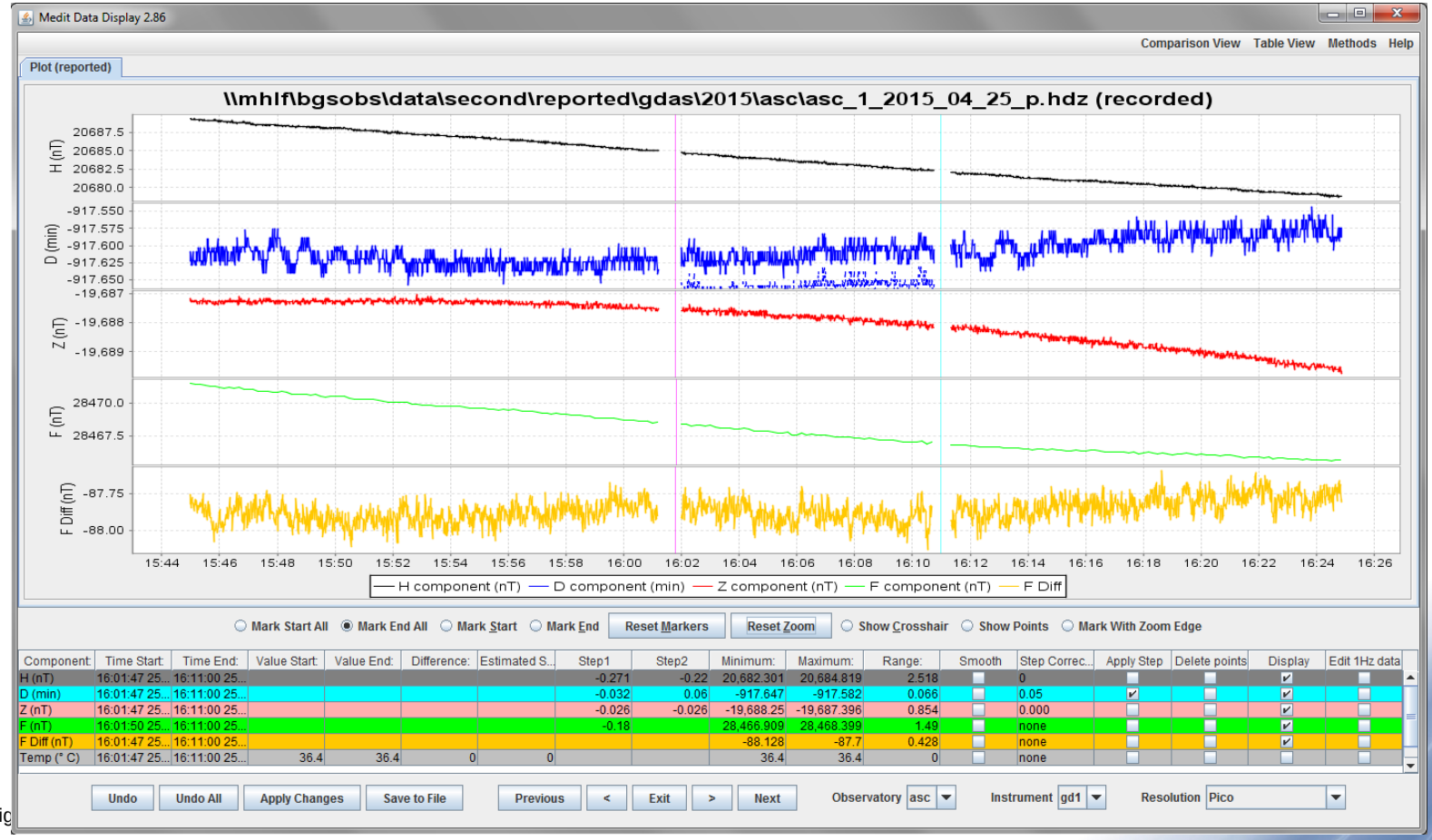
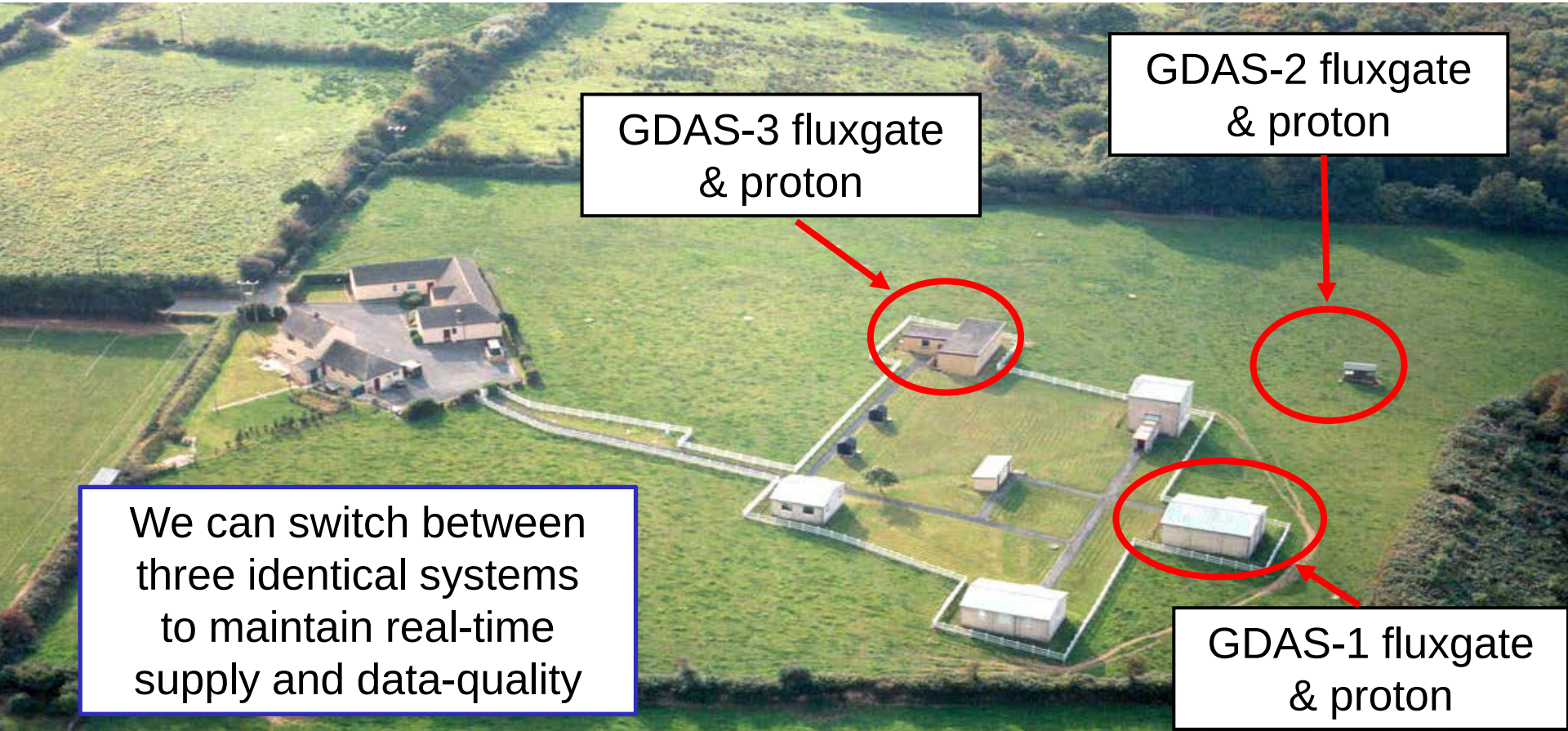
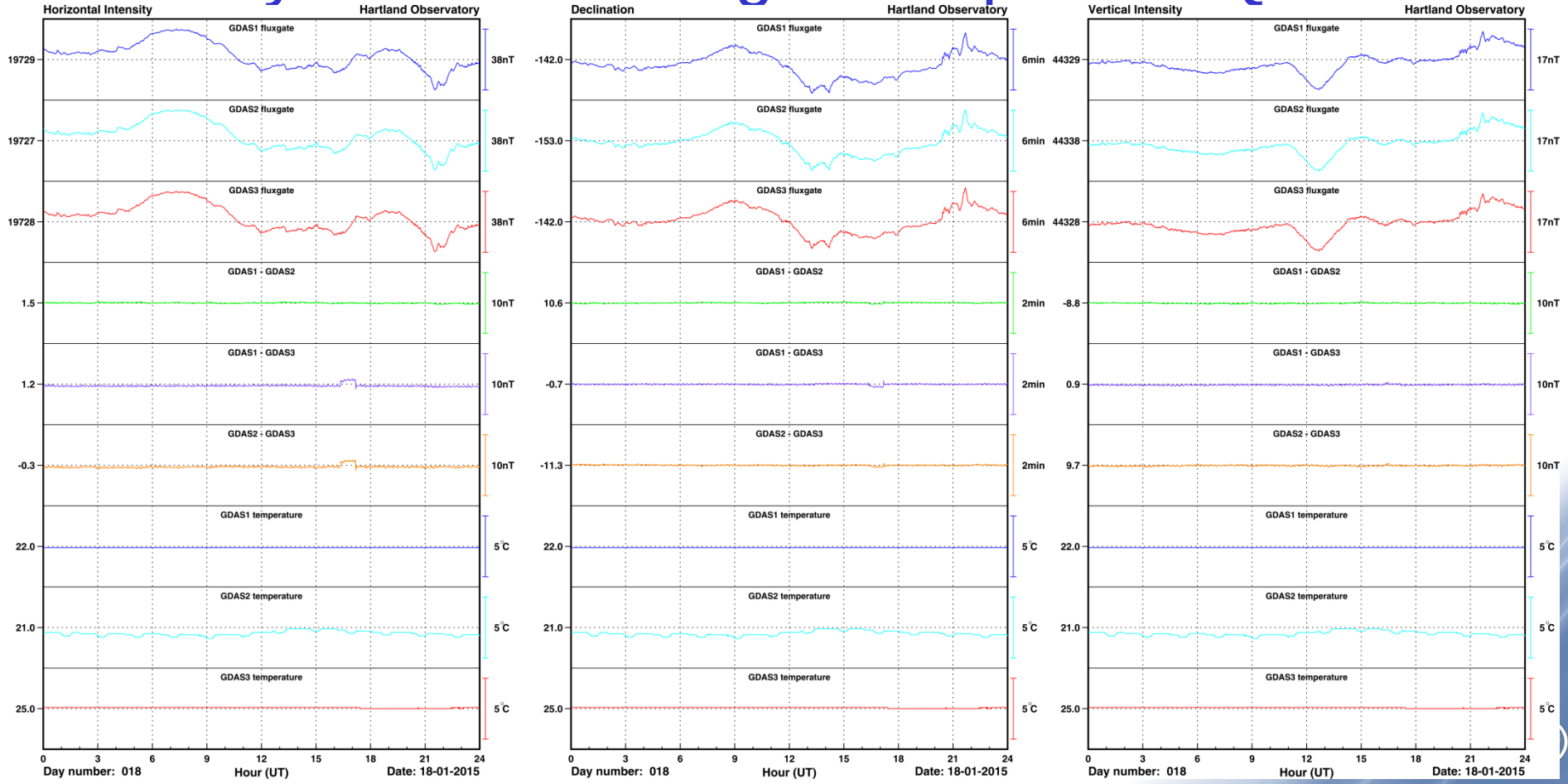


Multi system observatory set-up



Multi system obs– single component QC



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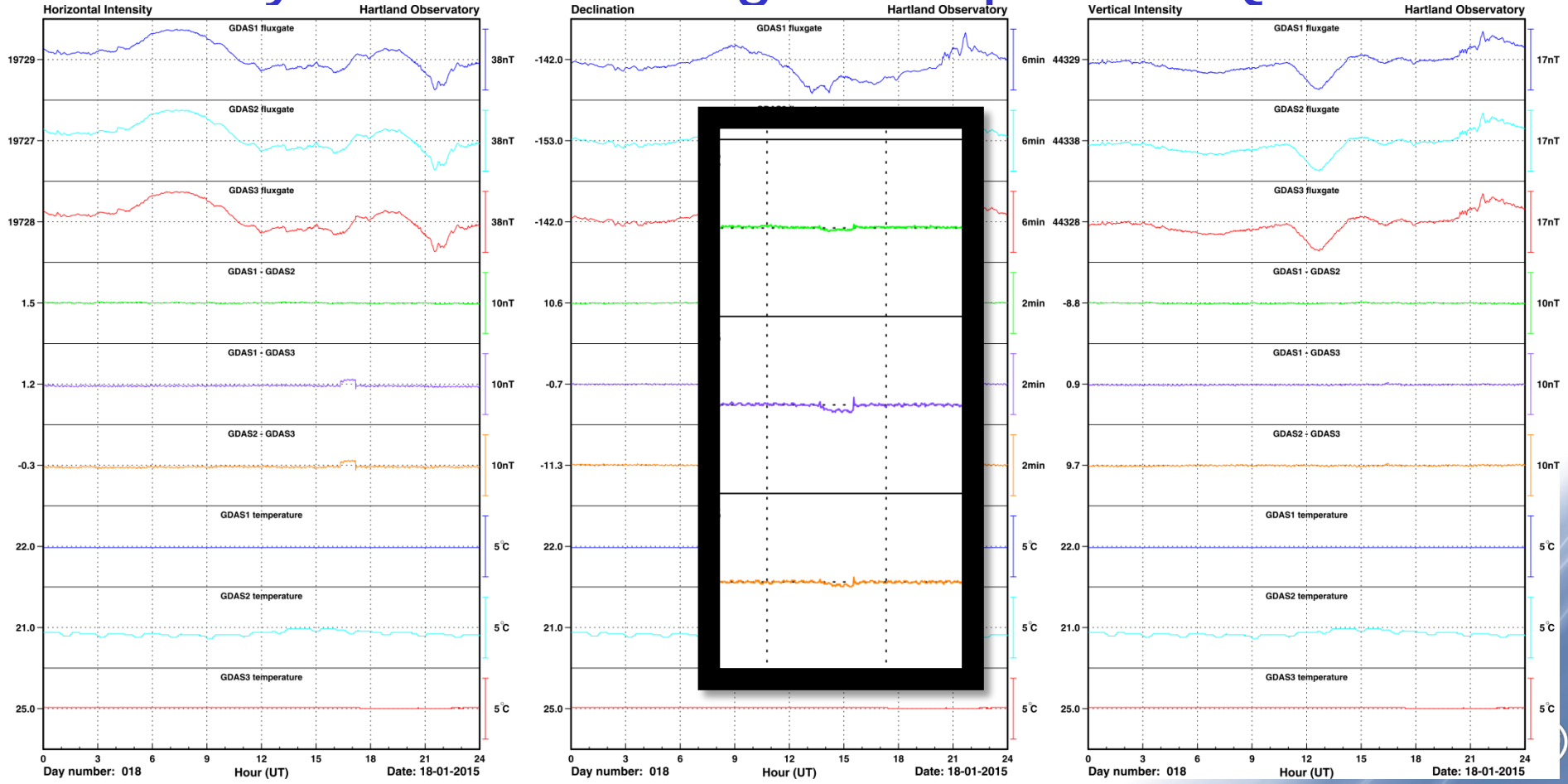
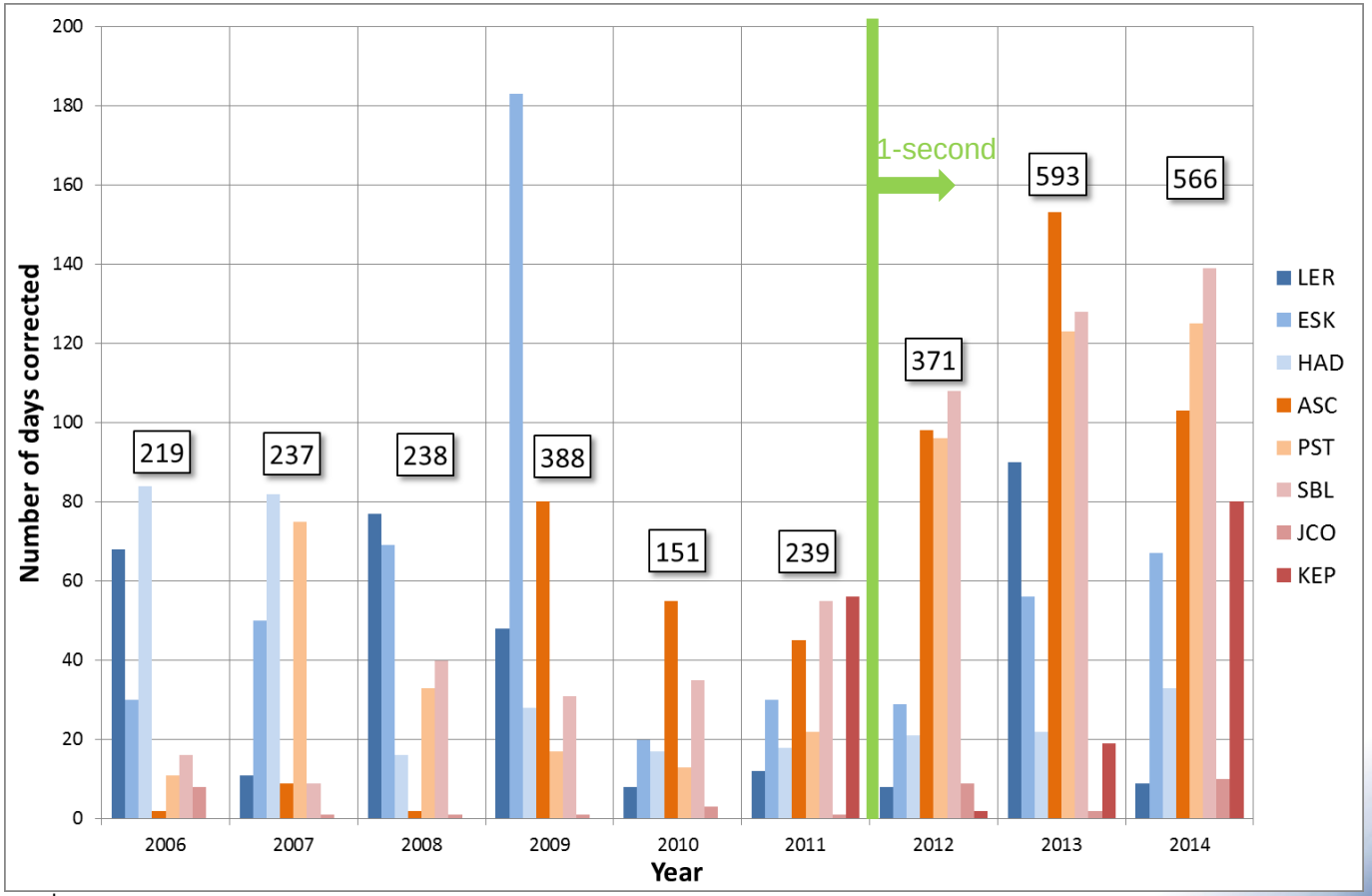
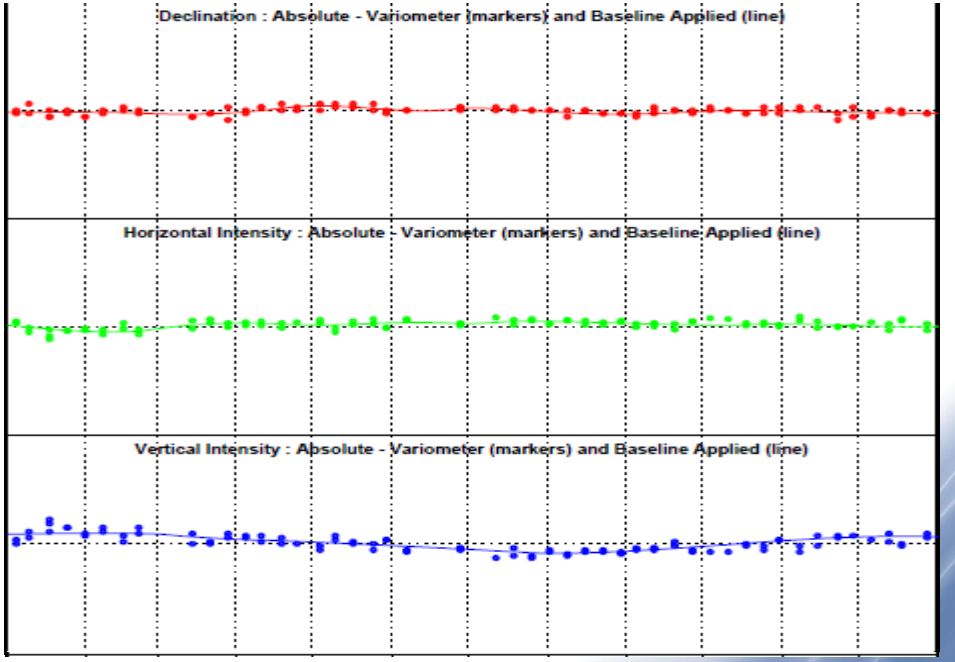


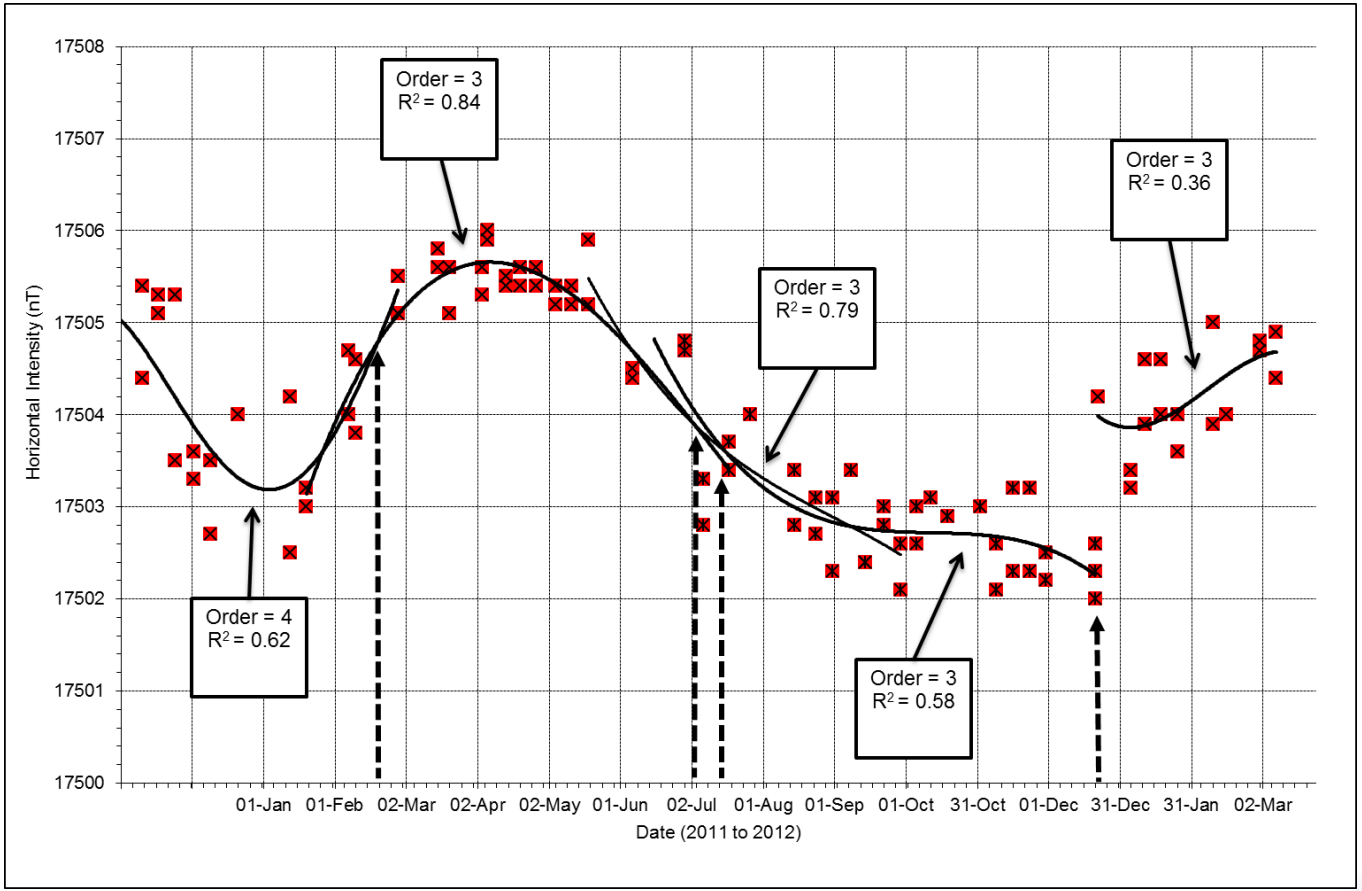
Number of data corrections per year, per obs



Quasi Definitive (QD) data production



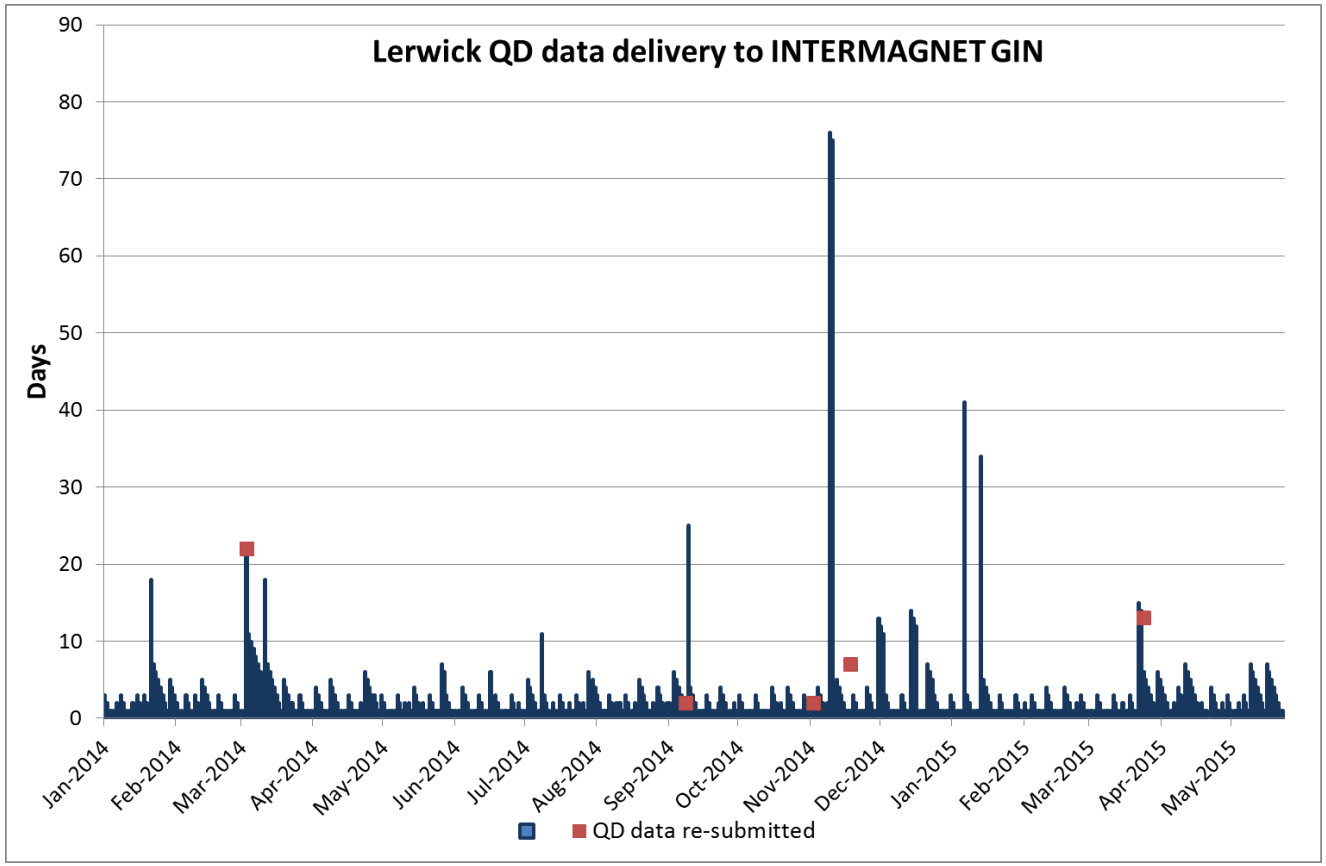
Baseline fitting – piecewise polynomials



Clarke, E., Baillie, O., Reay, S J., Turbitt, C W. (2013) A method for the near real-time production of quasi-definitive magnetic observatory data *Earth, Planets and Space*, 65 (11). 1363-1374. 10.5047/eps.2013.10.001

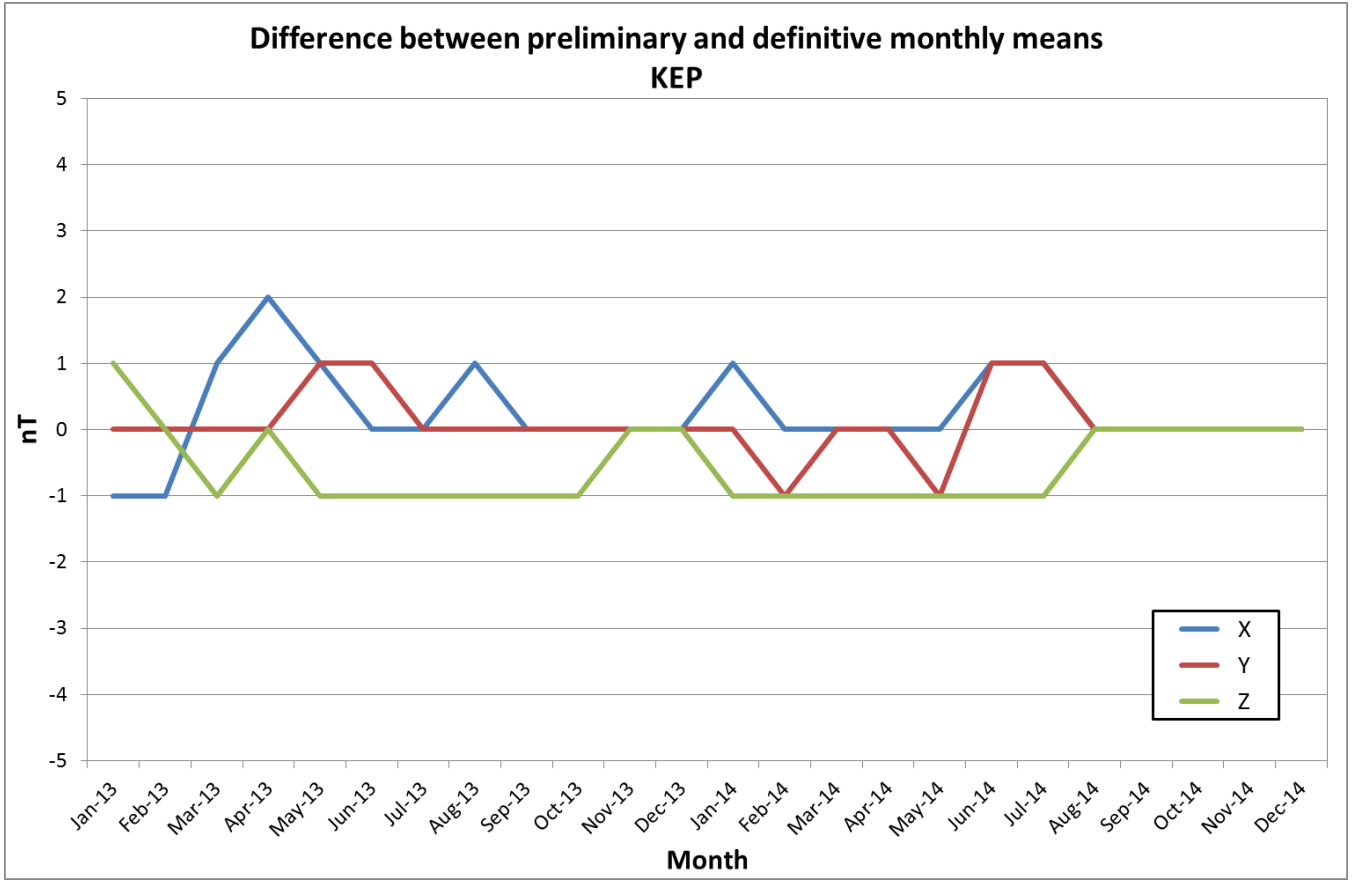
QD data delivery

Quasi-definitive data are:
"Made available less than 3 months after their acquisition"



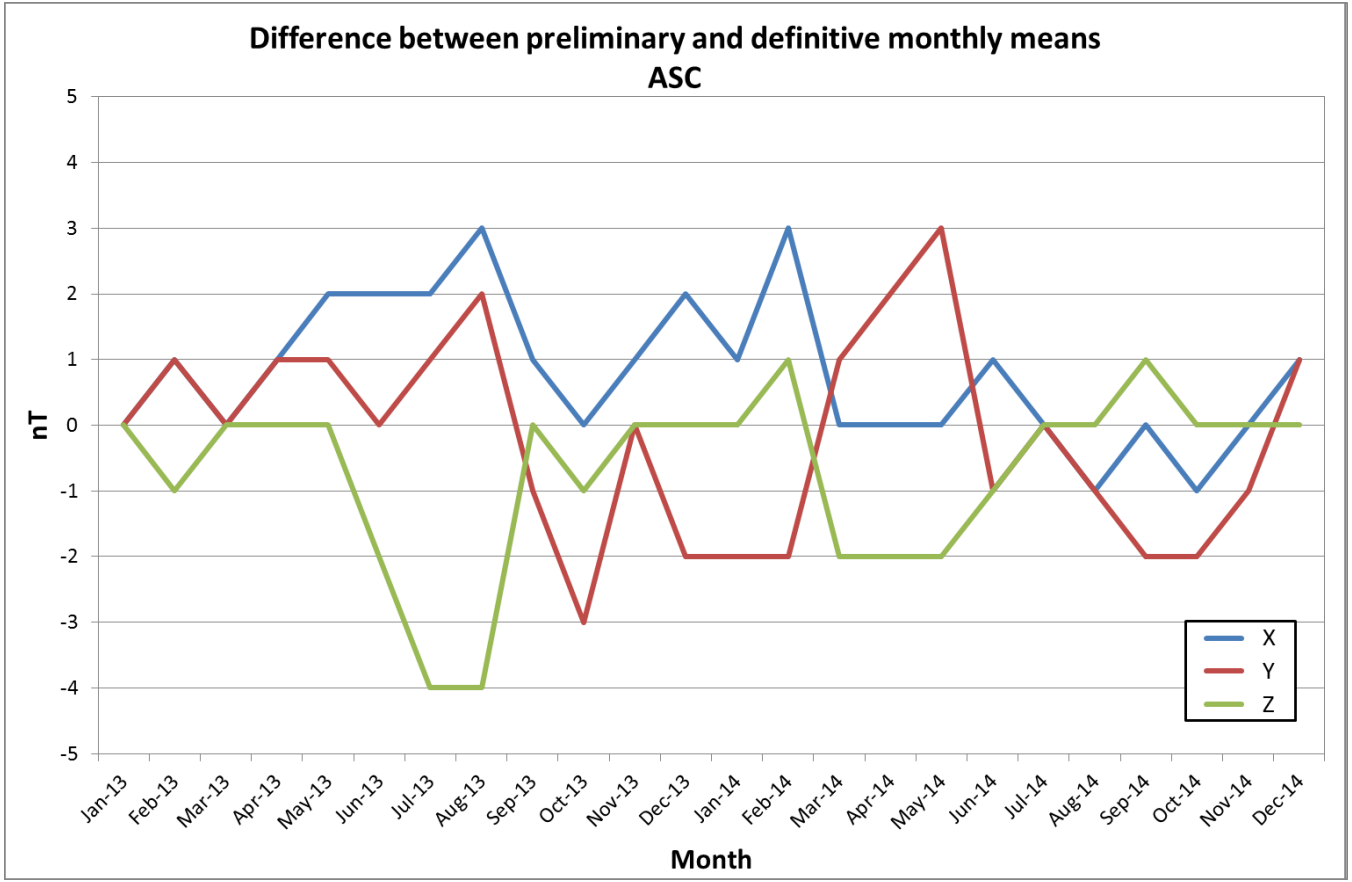
Obs	Delay in days (Mean)	Delay in days (mode)
LER	3	1
ESK	3	1
HAD	3	1
ASC	4	1
PST	5	1
SBL	4	1
JCO	3	1
KEP	4	1

QD data accuracy



Quasi-definitive data are:
"Such that the difference between the quasi-definitive and definitive (X, Y, Z) monthly means is less than 5 nT for every month of the year"

QD data accuracy



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End users

- Space weather services
- Indices production
- Magnetic modelling
- Swarm validation
- Directional drilling
- GIC monitoring

Summary

- One-second data – has increased the number of corrections required.
- Quasi-definitive data – BGS meet INTERMAGNET's defined requirements.
- Observatory data – wide range of users and applications; both for quasi-definitive and real-time.