S5: High level products for internal fields: main field

- *Finlay et al.* presented an application of the virtual observatory concept to Swarm data, within the framework of the Swarm DISC GVO project. This approach complements the traditional models based on the spherical harmonic expansion. Its ability to provide spatially localized error estimates will be useful for future assimilations into physical geodynamo models.

- *Hammer et al.* presented an application of the data obtained by the Cryosat platform magnetometers, as well as a new derivation of local field gradient component GVOs.

- In the presentation by *Kloss et al.,* the option of co-estimation of the vector magnetometer calibration parameters with a main field model was presented as an alternative to the use of an a-priori field model for magnetometer calibration. A similar technique was also presented in session 8 by *Alken et al.*

S5: High level products for internal fields: main field

- *Vigneron et al.* demonstrated the suitability of vector data from the ASM-V instrument for main field modelling.
- Two additional models leading to IGRF candidates have been introduced by *Ropp et al.* (with sequential assimilation approach allowing the inclusion of statistical information derived from physical geodynamo models), and by *Rother et al.* who investigated the possibility of using gradient only data to derive main field models, finding that this was not sufficiently stable.
- The recent developments and applications of the WMM model have been presented respectively by *Chulliat et al.* and *Paniccia et al.*

S5: High level products for internal fields: mantle conductivity

- A 1-D mantle conductivity model and its conversion into a temperature profile, that are based on an independent processing of Level1b vector data, have been presented by *Thébault et al.*
- *Velímský et al.* have shown the recent results of the 3-D time-domain chain and the development of a new approach to parameterizing field sources based on current loops.
- The contribution of *Kuvshinov* from Session 8 is also relevant here, as he has presented the improvements of the squared coherency between the external and internal field coefficients for two dominant ring current spatial modes by inclusion of Cryosat data.

S5: High level products for internal fields: lithospheric field

- Three presentations were dedicated to the modelling of lithospheric field. *Thébault et al.* have shown an improved model based on CHAMP, Swarm, as well as marine and airborne data grids from the WDMAM.
- *Baykiev et al.* have developed a model of time-dependent component of the lithospheric field. They have also provided new maps of vertically integrated magnetic susceptibility and models of remanent magnetization.
- *Smith et al.* have introduced a scheme to suppress the noise in modelling the lithospheric field in the auroral areas by first pre-processing to grid data sequentially in both geographic and QD latitude-MLT coordinates.

DQW#8 recommendations:
High level products (internal field)

23 Generate and distribute Swarm-based VO products. Extension of the product towards use of platform magnetometer data. Use of VO series to provide updated SV performance measures for Swarm and other missions. Development of tools based on Swarm products to advance our understanding of sub-decadal core dynamics.

24 Develop new data processing/modeling approaches using Swarm data to get better mantle conductivity models, including the use of platform magnetometer data.

25 ~~Justify rationale for 3D Earth approach using Swarm data~~