

World Digital Magnetic Anomaly Map (WDMAM) 2005-2008

Task Group Meeting at IAGA, Toulouse, 21 July 2005 13:30-17:00

Room Servanty, Pierre Baudis Congress Centre

Chairmen:

Juha V. Korhonen and Colin Reeves

Present:

as list attached

1§ **Opening of the meeting**
by Juha V. Korhonen, Co-chairman of WDMAM

2§ **Introduction to CGMW**
by Professor Jean-Paul Cadet,
President of the Commission for the Geological Map of the World (CGMW)

3§ **Progress report 2003-2005**
by Juha V. Korhonen on behalf of all 2003-2005 WDMAM members, associated with discussion at the meeting

- **Promotion:** Colin Reeves made promotion slides that are available at IAGA website. Posters and talks have been given at international meetings, and led to fruitful discussions with data owners and scientists developing methods.
- **Data access:** All freely available major national and regional anomaly data sets have been introduced to WDMAM. These are: Project Magnet, Arctic, North America, Europe, South Asia, Eastern Indian Ocean, Australia and Antarctica, and as digitized maps the former Soviet Union, China and East Asia. No coverage is yet available to WDMAM for Africa and South America. Satellite models of CM4 and MF4 have been available in open area.
- **Future data releases:** Discussions have been conducted with organizations having major data sets in proprietary areas. Some data owners are interested to take part in a global compilation, provided that they will be equal participants in the project. Co-operation with CGMW was initiated at 32nd IGC in Florence (August 2004) to establish a channel to invite organizations to take part. At IAGA 2005 Derek Fairhead announced his preparedness to release a 15 minute grid of Getech's data global holdings to the project.
- **Preliminary maps,** compiled of existing data: At IUGG 2003 WDMAM set itself a goal to compile existing sub-grids and profiles with CHAMP 3rd generation anomaly map to make a preliminary map (Toulouse map) for next IAGA. The map would present anomalies as they are, and indicate that there's enough available coverage for a world map. For this purpose Stefan Maus provided a set of open access files, Juha Korhonen made formatting and coordinate transformations, and distributed files, Stefan Maus (MF3-4), Dhananjay Ravat (Project Magnet), Colin Reeves and Michael Purucker provided further datasets. Juha Korhonen, Kumar Hemant and Michael Purucker, each presented a preliminary world map in Session GAV04 at IAGA 20 July 2005, pointing out some problems for future compilations.

- **Project plan:** Juha Korhonen distributed by email a project time schedule for a single map process, for comment and further development. The schedule was modified for alternative multiple-parallel map procedure for WG V-MOD meeting during IAGA 2005. This was further modified at the WDMAM meeting (below).
- **Anomaly definition and calculation session at IAGA 2005:** Originally planned half-day session plus posters was extended to a full day session (GAV04). Altogether 32 presentations were given. Number of participants exceeded 70 persons at times. Participants unanimously considered the session successful.
- **Resource allocation:** GFZ-Potsdam applied funds from DFG, and employed two half time post-Docs (Kumar Hemant and Erwan Thebault). Dhananjay Ravat employed a student to make reductions and brought some of the data into usable format. Other WDMAM members had continuing opportunity to work part-time on WDMAM activities. In addition Takemi Ishihara, Tamara Litvinova, Michael Purucker and Mita Rajaram made preparatory efforts useful for WDMAM.

4§ **Invitations to contribute data and produce candidate grids**

- CGMW and Juha Korhonen will distribute invitations to take part in the project, submit data, compile grids and present a candidate grid for the first edition of the world map.
- Invitation and map specifications will be given at the website of WDMAM to be designed by Susan McLean.
- When submitted voluntarily or by invitation, national or regional grids will be transmitted first to Juha Korhonen, GTK, who will make them available for making candidate world grids via the secure ftp site of WDMAM, currently located at the server of GTK (<ftp.gtk.fi>) where the grids already acquired may already be found.

5§ **Principles of map compilation**

- **Definition of anomaly:** Total field anomaly component of the Earth's magnetic field at an altitude of 5 km above the Earth's surface, caused by quasi-static upper lithospheric sources.
- **Definition of wavelength band:** Low cut limit corresponds to degree and order 15 of global spherical harmonics (approx. 2600 km wavelength at equator). Short-wavelength limit corresponds to 10 km, due to 5 km resolution of grid.
- **Definition of grid:** 5 km resolution, geographic and planar grids as defined at World Geological Map 1:50 million scale by CGMW. (Three projected grid windows, the main one in Mercator but with two (north and south) polar stereographic projections). Closer definition will be given at the call of data sets and candidate global grids.
- **Definition of path:** complete processing paths starting from WDMAM list data sets to global subgrids and further to each candidate global grid.

- **Source data:** Initial data and their specifications (metadata) will be available from WDMAM, by permission of the data owners, and will be same for all contributors. The official list of available, authorized data sets will include continental and oceanic data (national and regional grids, and profiles), and whole-earth satellite models for lithospheric sources (e.g. MF3-4) plus models of the Earth's magnetic field for reduction of the data (e.g. CM4). WDMAM will accept data sets with proper authorization only.
- **Methods:** The contributors may freely choose the methods, provided that they are transparent, scientific, and reproducible for desired parts at the review. An adequate description of the methods and merging procedures of specific large segments of maps must be attached to the candidate models.

6§ **Schedule of map preparation, review, printing and distribution**

- **September 2005**
 - Invitations to Geological Surveys, Oceanographic Institutes and other data owners will be made jointly with CGMW.
 - Prior to this review organizers Ravat and Reeves are requested to give their list of minimum specifications of candidates for review, to be included in the call of candidate grids.
- **October 2005**
 - First data sets by invitations will be received, registered and moved to WDMAM ftp-site.
 - Upon needs, subgroups may be established e.g. for South America, China, Northern polar area, Antarctic, Africa, India, Australia, Europe, Oceans, Satellite anomalies, Modelling and Metadata.
- **February 2006**
 - An interim map (WDMAM 0.8) will be presented to the General Assembly of CGMW at Paris. This map will consist of preliminary layout and legend information. The thematic windows are filled with reliable images representing anomalies of that window and will be replaced by final data images later on.
 - On this occasion CGMW and IAGA will apply for UNESCO financial support and right to use its logo on the map.
 - Once printing support is arranged and decided and the print run of the First Edition established, a tender for printing will be sent to printing houses for printing in April-May 2007
- **June 2006**
 - Deadline for receiving national and regional data by the end of June 2006.
 - Data submitted after the deadline will be included in the list of next edition of the map, to be released at the 33rd IGC in Oslo 2008.
 - In special cases, WDMAM may decide to accept a late data set, provided that all candidate grids will have equal opportunity to clearly benefit from it.
- **September 2006**
 - Map gate for WDMAM 1.0 candidates will be closed at the end of September 2006.
 - Complete candidates would be submitted to a network-site or mail address given at the call of models.

- **October 2006**
 - The pdfs and digital grids plus detailed descriptions of how long-wavelengths were dealt with and how individual short-wavelength parts were merged would be sent for internal review of the WDMAM at the beginning of October 2006. Ravat and Reeves (who do not propose to present candidate maps) were appointed by the meeting to execute the internal review and to manage the progress calendar as set out here. Queries about unclear processing steps and their resolution will be conducted during this review time.
- **December 2006**
 - WDMAM will process results from internal review and make the decision on the final map at the beginning of December 2006.
 - Final adjustments by WDMAM will be made to the map, a pdf will be prepared and sent together with attached material (metadata, grids, method description) to CGMW for their independent scientific review
- **February 2007**
 - Scientific review will be received from CGMW by the end of February
 - Based on the review and remaining work the printing would be ordered and time reserved from the selected printing house.
- **March 2007**
 - Final changes WDMAM 1.0 will be made in March 2007
- **April 2007**
 - Pdf-file for printing will be ready by 15 of April 2007
 - Color separates, lines and fonts for 4-color offset printing.
 - Consulting with the printing house during preparation of the pdf.
 - The printing house will order printing plates.
- **May 2007**
 - Printing will be complete and maps mailed by the end of May 2007.
 - Test prints
 - Color density adjustment for geophysical color scales
 - Printing
 - Cutting
 - Folding
 - Special wall and heavy duty maps (unfolded, waterproof)
 - Mailing
- **July 2007**
 - Presentation of the map and distribution of the DVD at General Assembly of IUGG/IAGA at Perugia, July 2007.
 - Paper map 1:50 000 000
 - Digital map on a DVD
 - Agreement for user data access
 - WDMAM 1.1 (Digital Perugia Map)
 - layers (anomaly, total field, satellite level, detailed levels, base map)
 - structure and attributes of metadata
 - software for accessing digital map
 - DVD media for distribution
 - licence agreement for users

- **August 2008**
 - Release of the next version (WDMAM 1.x or 2.0) at General Assembly of the CGMW during 33 ICG, Oslo 2008.
 - Includes improvements based on feedback by evaluation of the First Edition
 - Updated digital files, new grid information and a new pdf-version of the map.
 - Data gate for this version would close by February 2008.
 - The digital version of the map may include a long wavelength component, modelled by spatial lithospheric sources, and another detailed grid component around geomagnetic observatories and other key areas.
 - Further, geologically useful maps could be, for example, globally polar-reduced anomaly, or vertically integrated magnetization calculated from this.
 - Decisions of CGMW and IAGA on continuing towards new editions, features and access modes

7§ **Future WDMAM sessions**

- IUGG 2007, Perugia, tentative title: World Digital Magnetic Anomaly Map, Characteristics of Candidate Grids and the First Edition; length full day.
- 33rd ICG, Oslo: a request for having opportunity of a session. (request was made in 22 July to the organizing committee)
- A special issue of a suitable journal with papers concerning the map publication and the scientific work that has gone into it.

8§ **WDMAM Task Group executive 2005-2007**

Juha V. Korhonen, Co-Chairman
 Colin Reeves, Co-Chairman, review organizer
 Dhananjay Ravat, review organizer
 Stefan Maus / Susan McLean

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Mioara Manda
 Michael Purucker
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 Tamara Litvinova
 Peter Milligan, external advisor
 Marta Ghidella, external advisor

9§ **WDMAM members**

- All organizations and persons taking part in WDMAM activities will have a member status at WDMAM Task Group upon invitation sent by the co-chairmen of WDMAM or CGMW.
- Membership may be granted for limited or unlimited periods.

10§ **Next WDMAM meetings**

- A full meeting will be held during EGU 2006 in Vienna
- A full meeting will be held during IUGG/IAGA 2007 in Perugia
- Further full meetings may be arranged by agreement of all executives by email.
- Executives may have partial meetings of the WDMAM Task Group, provided that all are informed.
- Technical possibilities will be studied to arrange net meetings by computers and web cameras.

11§ **Closing of the meeting**

by Colin Reeves, Co-chairman of WDMAM.

World, 22 August 2005

Signatures (WDMAM executives present at Toulouse)

..... Juha V. Korhonen Colin Reeves
..... Dhananjay Ravat Stefan Maus
..... Mioara Manda Michael Purucker
..... Takemi Ishihara Tamara Litvinova

Appendix: **List of participants**

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