Call for IGRF-11 Candidate models

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Dear modellers & evaluers,

Please consider contributing to the 11th generation International Geomagnetic Reference Field (IGRF-11). We seek candidate models for the

1) Internal field (main field) for 2010.0 to degree and order 13
2) Predicted average secular variation for 2010.0-2015.0 to degree and order 8
3) Internal field (main field) for 2005.0 to degree and order 13

The requested numerical resolution of the coefficients is 0.01 nT for all products. This will allow calculation of the final models to a resolution of 0.1nT.

Each group that plans to submit candidate models is requested to provide a list of the products they intend to submit and a brief description (one paragraph) of their methodology by August 15th, 2009. These will be summarised and presented by the IGRF task force chair at the IAGA WG-MOD Business meeting in Sopron.

PUBLICATION:

Earth Planets and Space has agreed to have a special issue devoted to global magnetic field modelling and IGRF-11.

Submitted articles will undergo a rigorous review process. It is the authors' responsibility to make sure that their article meets the commonly accepted standards of a scientific paper. Submission of a candidate model is no guarantee of acceptance of the accompanying manuscript for the special issue.

DEADLINES:

- Brief notice of intent to IGRF task force chair: August 15th, 2009
- For candidate model submissions (including model information): October 1st, 2009
- For evaluating the candidate models: November 15th, 2009
- Manuscript submissions to the EPS special issue: November 30th, 2009

TEAM RULES:

- Each team of workers should submit only one candidate model per product.
- Every lead institution can have only one team, and every individual can lead only one team
- In order to facilitate collaboration (for example sharing of pre-processed data), it is possible for an individual to be a member of several teams

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EVALUATION OF CANDIDATES:

- The candidate models will be assessed by the IGRF task force in co-operation with representatives from the teams submitting the candidate models
- Any scientifically plausible method of testing/analysis/validation is acceptable
- see http://www.terrapub.co.jp/journals/EPS/pdf/2005/5712/57121173.pdf for a summary article on the evaluation of the previous IGRF-10 candidate models

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FURTHER COMMENTS AND INFORMATION:

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1) The MAGNETIC REFERENCE RADIUS for the spherical harmonic expansion remains at 6371.2 km. This is just an arbitrary reference radius and simply a convention.
2) Following the new naming convention decided at Sapporo (see minutes at http://www.ngdc.noaa.gov/IAGA/vmod/min2003.html), we are calling for the IGRF 11th generation, short name IGRF-11, valid from 1900.0 to 2015.0, definitive for 1945.0 to 2005.0. Thus, the coefficients for 2010.0 will be revised to become definitive in IGRF-12.
3) We ask all modellers to submit models in the following format:
<institution>
Candidate for <product>
n m gnm hnm uncertainty gnm uncertainty hnm
values...
- Here, m runs from 0 to n
- No additional header lines
- The estimated uncertainty should where possible be a realistic estimate of the true uncertainty and not simply the formal error. A null entry should be made if no uncertainty estimates are available
4) We ask all modellers to provide additional accompanying information about their models along the following lines:

SUGGESTED ADDITIONAL INFORMATION ABOUT CANDIDATE MODELS

- Which satellite, observatory and repeat station data sets were used?
- What were the data selection and rejection criteria?
- What weights were allocated to the different kinds of data?
- Were data weighted for equal spatial or temporal coverage?
- How was the forward extrapolation to 2010.0 for the field coefficients done?
- How is the average secular variation from 2010.0 to 2015.0 predicted? Was the present secular variation taken, or was it forward extrapolated to 2012.5? Was the procedure tested by hind-casting the known field at earlier times?
- If iterating the Least Squares process, what was the starting model used, and how many iterations were needed?
- What, if any, regularization was used, e.g., use of an a-priori model with specified (co-)variance, or addition of some quadratic penalty function to the sum square deviation?
- What was the method used to solve the Least Squares equations?
- What was the fit to the data?
- Please give some indication of the (co-)variances of the resulting set of coefficients. One possibility is to estimate models from different data sub-sets (e.g. CHAMP+Observatory versus Oersted+Observatory) and comparing the resulting models.
5) Further information concerning the Division V working group V-MOD can be found on the web site of IAGA at http://www.ngdc.noaa.gov/IAGA/vmod/index.html

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The following temporary website will be used to make the candidate models available during the evaluation process

http://www.epm.geophys.ethz.ch/∼igrf-11/index.html

Please email your models & descriptions to

Chris Finlay, cfinlay@erdw.ethz.ch (cc to Stefan Maus, stefan.maus@noaa.gov)
