

# IAGA Division WG V-MOD Business Meeting

Tuesday, 25-Aug-09

Chair: Stefan Maus

Co-Chair: Chris Finlay

# Agenda

- International Geomagnetic Reference Field
  - Accuracy of the previous IGRF-10
  - Available geomagnetic measurements
  - Report of IGRF-11 Task Force Chair, C. Finlay
- World Digital Magnetic Anomaly Map
  - Report of WDMAM Task Force Chair, J. Korhonen
- Proposed ISO-norm for the main field
- Proposed sessions for IUGG 2011
- Any other business

# Accuracy of IGRF-10 (2005 release)

Mainfield in 2005

Model	Institutions	Error (nT)
IGRF-A	DNOSC, GSFC, Newcastle	18.0
IGRF-B	NGDC, GFZ	18.6
IGRF-C	BGS	33.0
IGRF-D	IZMIRAN	40.6
IGRF		20.5

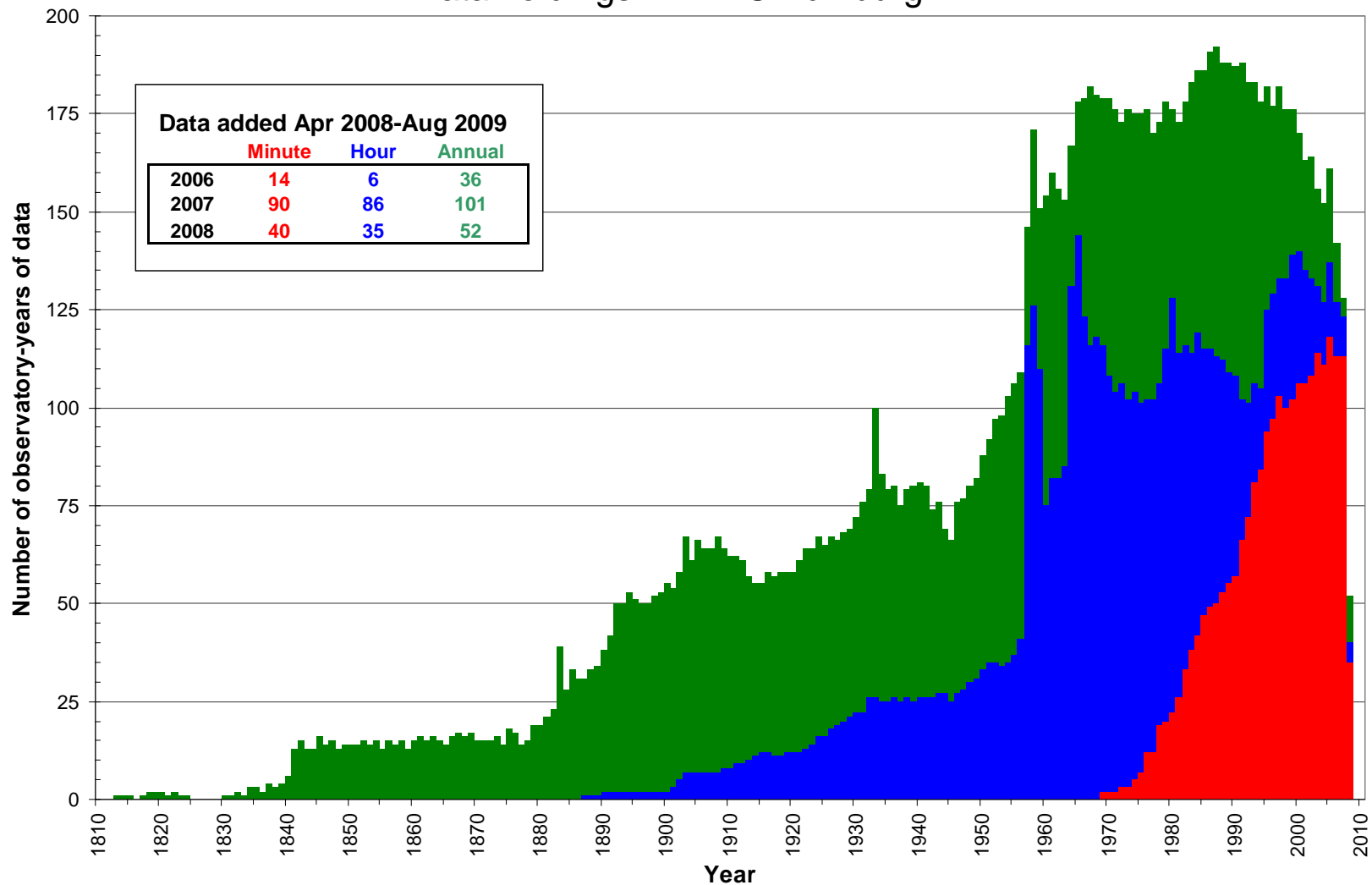
RMS error against CHAOS-2  
(Olsen et al., 2009)

Mean SV from 2005 to 2010

Model	Institutions	Error (nT/yr)
SV-D	IZMIRAN	25.9
SV-A	DNOSC, GSFC, Newcastle	30.8
SV-B	NGDC, GFZ	32.7
SV-C	BGS	38.9
IGRF-SV		29.3

Error against SV 2005-2009 of  
CHAOS-2 (Olsen et al., 2009)

# Data holdings in WDC Edinburgh



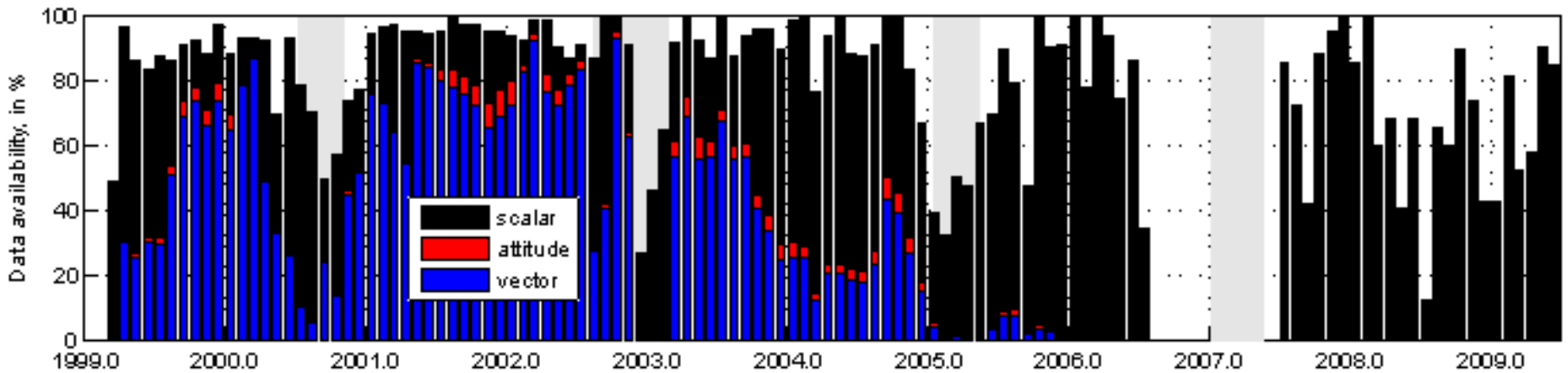
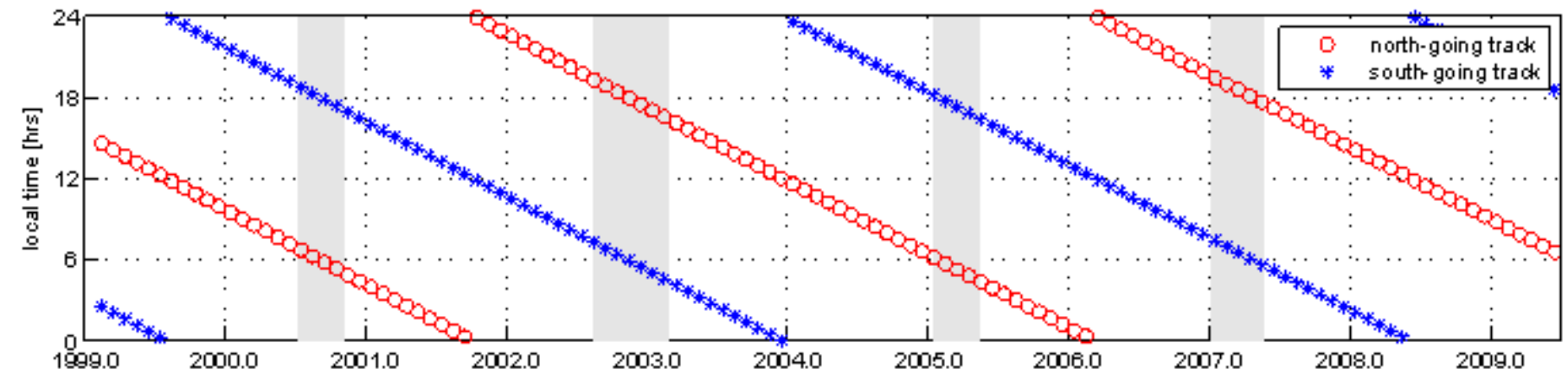
**Available CHAMP ME data****Level 2**

<b>Source</b>	<b>Time</b>	<b>Sample Rate</b>	<b>File format</b>	<b>Begin</b>	<b>End</b>	<b>Description</b>
ASC-BOOM	UTC	1 Hz	ASCII	2000-07-26	2009-08-16	Star camera in common reference system
FGM-FGM	UTC	1 Hz	CDF	2000-07-26	2009-08-16	Corrected magnetic vector field in FGM system
FGM-NEC	UTC	1 Hz	CDF	2000-07-26	2009-08-16	Corrected magnetic vector field in NEC system
FGM-SCI	GPS	50 Hz	CDF	2000-07-26	2009-08-16	Corrected magnetic vector field in FGM system
OVM	GPS	1 Hz	CDF	2000-07-26	2009-08-16	Corrected magnetic scalar field
PLP	GPS	1 Hz	ASCII	2000-07-28	2009-08-16	Electron density

**Level 2\_X**

<b>Source</b>	<b>Level</b>	<b>Time</b>	<b>Sample rate</b>	<b>File format</b>	<b>Begin</b>	<b>End</b>	<b>Description</b>
FGM-NEC	2.6 Version 51	UTC	1 Hz	CDF	2000-07-26	2009-07-31	Corrected magnetic vector field in NEC system including Euler angle correction

# Ørsted



# ISO standard for main field

## 1. Background:

- ISO TC20/SC14/WG4 passed Resolution 263 in 2007 stating that “... IAGA Div V WG-MOD continues to be the organization that provides scientific leadership in the effort to develop an Earth main magnetic field standard.
- We need to come up with a sensible draft document, otherwise this may be taken out of our hands

# ISO Standard for main field

## Complication 1:

“Main field” models contain contributions from

1. Core field
  2. Long-wavelength lithospheric field
  3. Long-period induced fields
- Difficult to define “Main field”

## Suggestions:

- Instead of defining “main field”, let us define a ***standard file format*** which is suitable for exchanging and distributing IGRF-type field models
- For predictive models: need only static field and SV



# ISO standard for main field

## Complication 2:

- Historically, the “main field” is the field that can be resolved from ground observatories
- For practical applications (e.g. navigation), all that matters is that the model represents the *internal* part of the Earth’s magnetic field

## Suggestion:

Let us call it the “ISO standard for internal geomagnetic reference field models”

# ISO Standard for internal geomagnetic field models

Suggest Comma-Separated-Values (CSV) file format:

Name: IGRF-11-test  
Release date: 2009-11-19  
Epoch: 2010.0  
Model validity: 2010.0-2015.0  
Static degree: 13  
SV degree: 8

#

# n m Gnm Hnm SV-Gnm SV-Hnm

#

1,	0,	-29565.7918,	0.0000,	11.9762,	0.0000
1,	1,	-1682.3944,	5100.5753,	13.0028,	-22.1803
2,	0,	-2324.4384,	0.0000,	-13.4908,	0.0000
2,	1,	3052.7123,	-2571.6863,	-4.6602,	-22.5690
2,	2,	1658.7839,	-503.6099,	-1.3510,	-11.4691

# ISO Standard for internal geomagnetic field models

ISO Document will further state:

- Magnetic reference radius is 6371.2 km
- Gauss coefficients are Schmidt semi-normalized
- Equations for the magnetic potential and vector components

# Suggested sessions for IUGG-2011

- Geomagnetic secular variation on annual to centennial scales (C. Finlay, ? )
- Modeling of lithospheric, induced and external magnetic fields (M. Hamoudi, )
- Tectonic interpretation of magnetic, gravity and seismic data (D. Ravat,
- Results from the decade of geopotential research and future prospects (C. Beggan, )
- WDMAM-2011 (E. Thebault)

# IAGA Div-V Working Group V-MOD

Minutes and presentations will be posted at:

<http://www.ngdc.noaa.gov/IAGA/vmod/>