



EGM2020: Updates

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September 18th 2019

NATIONAL GEOSPATIAL **NGA** INTELLIGENCE AGENCY

▶ EGM2020 Global Model

- Projected Release Date Apr 2020
- Same structure as EGM2008
 - a 5' x 5' resolution is consistent with the customers needs
 - ellipsoidal harmonic model up to degree (n) and order (m) 2159
 - spherical harmonic model to degree 2190 and order 2159

EGM2020 (Earth Gravitational Model 2020): Status, challenges, weaknesses, improvements with respect to EGM2008, how can Latin America contribute to improve the quality of the EGM series and improving their local geoids.

► Ongoing Efforts for 2019/2020

Methodology

- Hybrid Altimetry Model utilizing DTU15, 17 and Sandwell & Smithv28
- GRAV FREE Ref field 30s and 5 min
- GOCO06S Satellite solution
- Correction Coefficients development
- General error modeling for the final EGM based off EGM2008 with improvements for regions where new data has been incorporated.

► IAG PGM Review results for PGM 2017

- N. Africa and Egypt
- Canada
- S. America
- India
- Australia
- Germany
- CONUS
- Croatia

Results have been generally favorable! 😊

► Terrestrial

No substitute for actual data, relative or absolute.

Absolute gravity – used as truth data for comparisons.

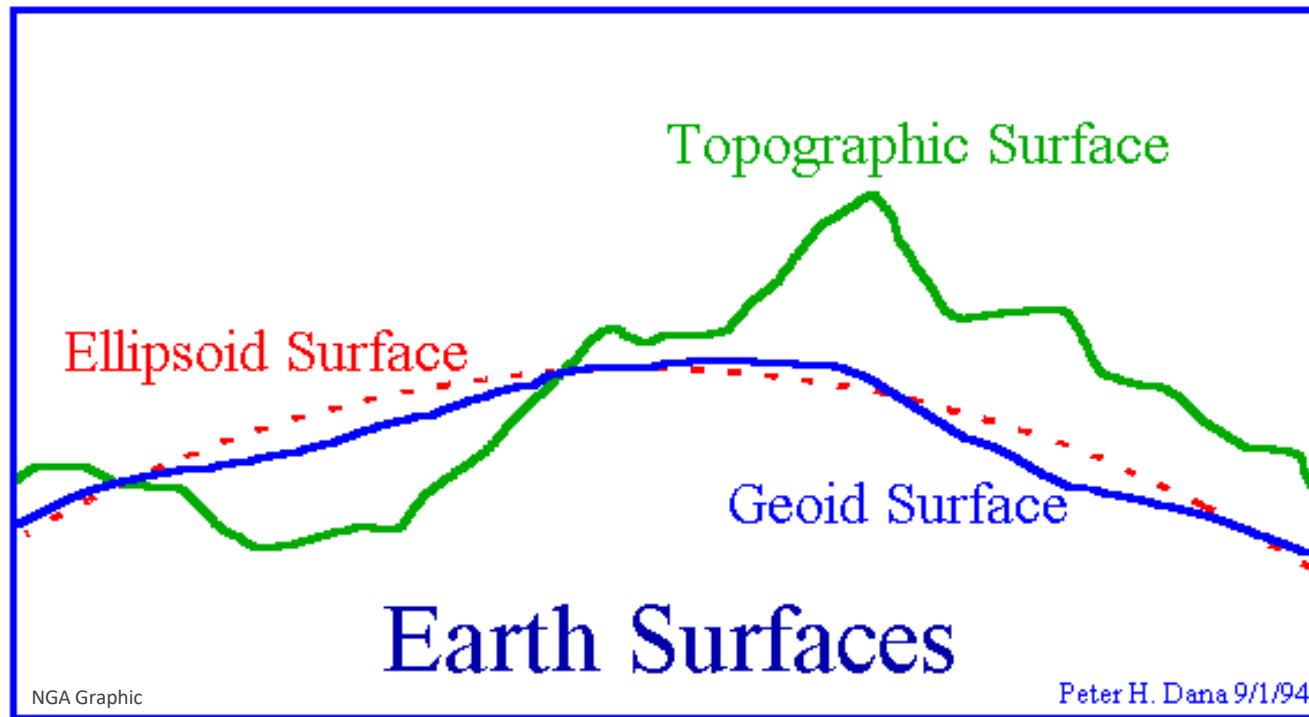
Relative gravity – used for global/local gravity models.

Astronomic deflection of the vertical – used as truth data for comparisons.

GPS Leveling – used for geoid height validation

► How to improve geoid over S. America

1. Gravity surveys
 - i. Absolute
 - ii. Relative
 - iii. Astronomic Deflection of the Vertical (DoV)
2. Airborne surveys
 - i. DTU
 - ii. GRAV-D (NGS)
3. Mutual cooperation/Data sharing



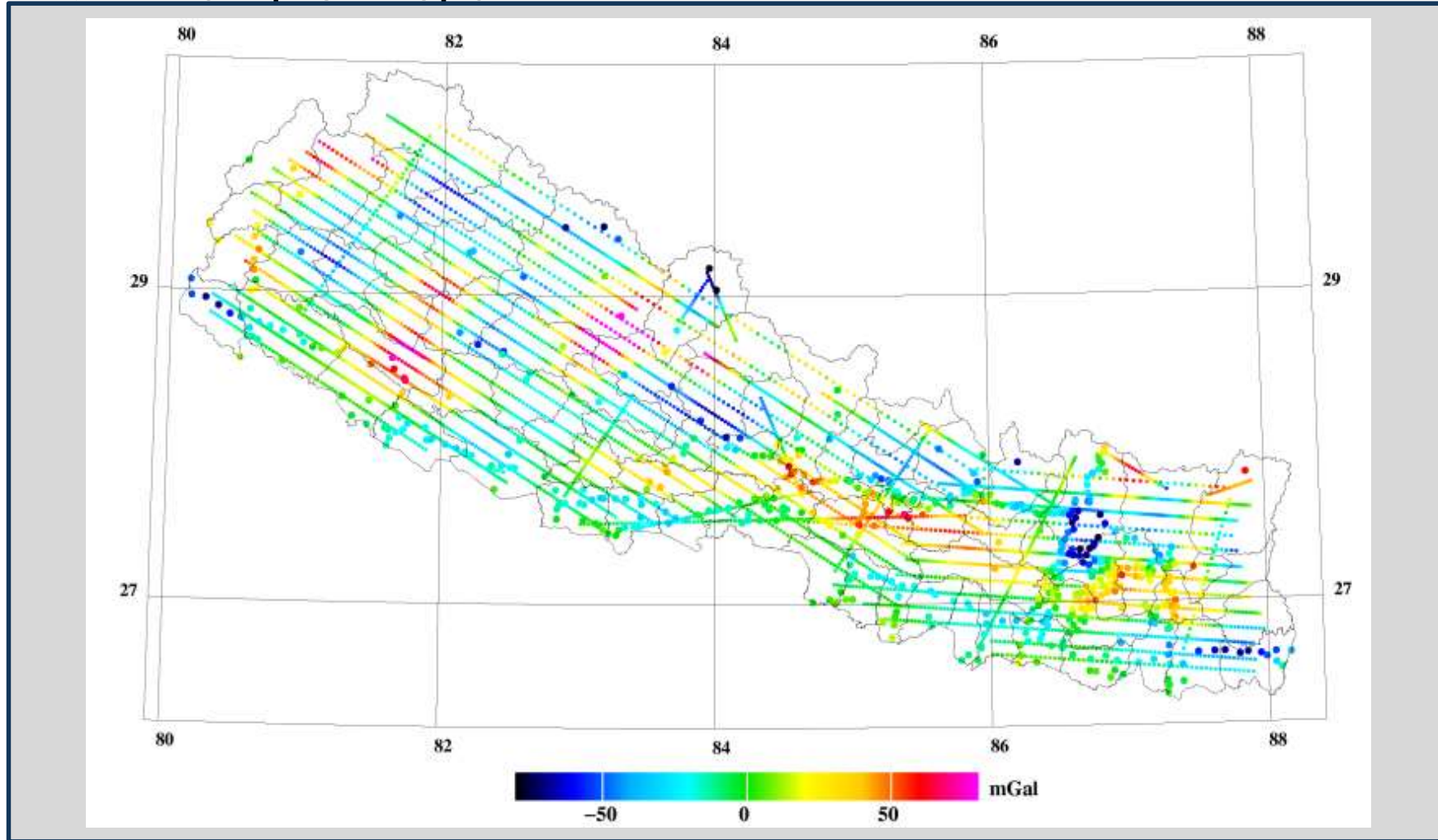


NGA Photo

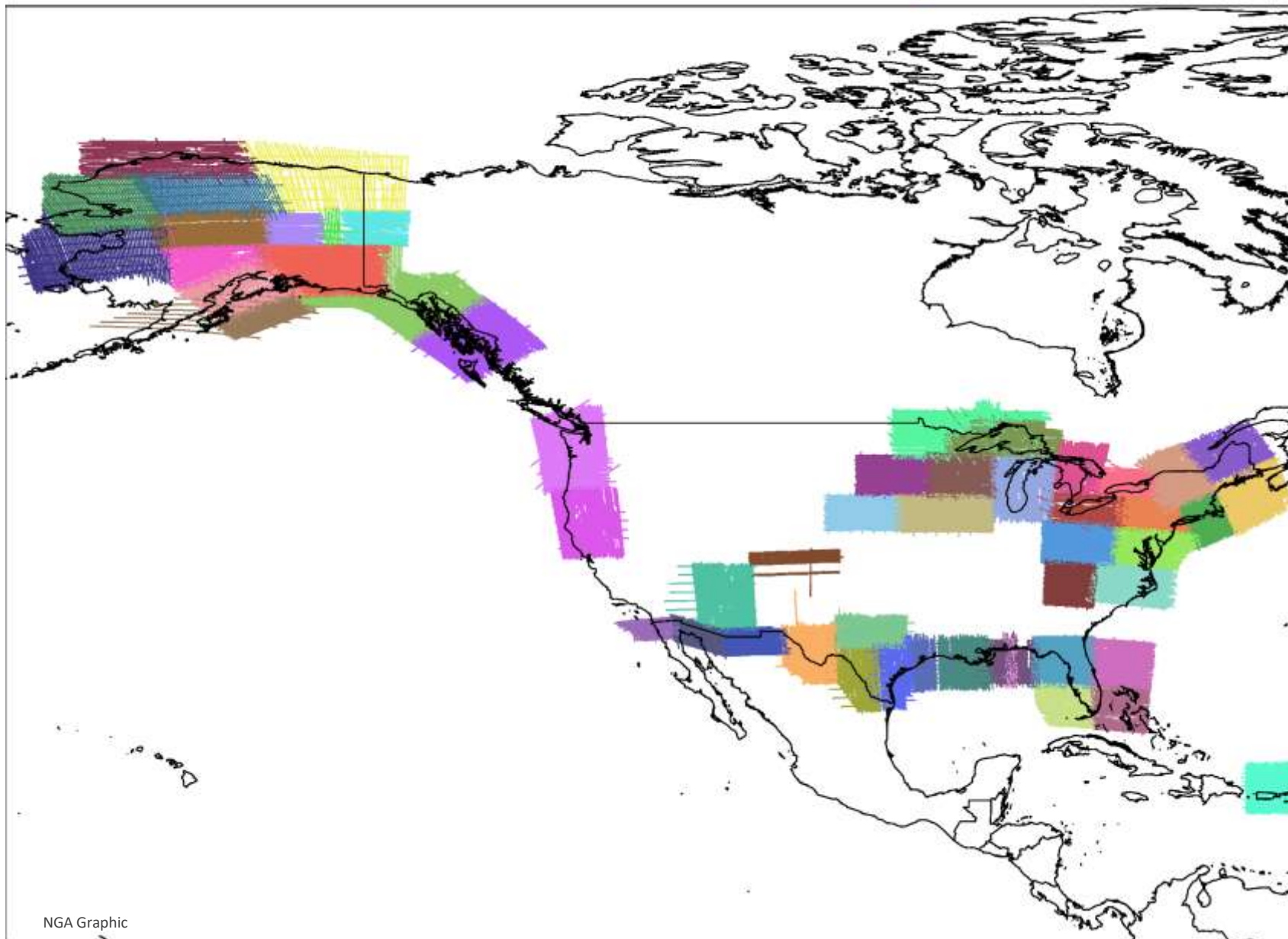


NGA Photo

► Example: Nepal

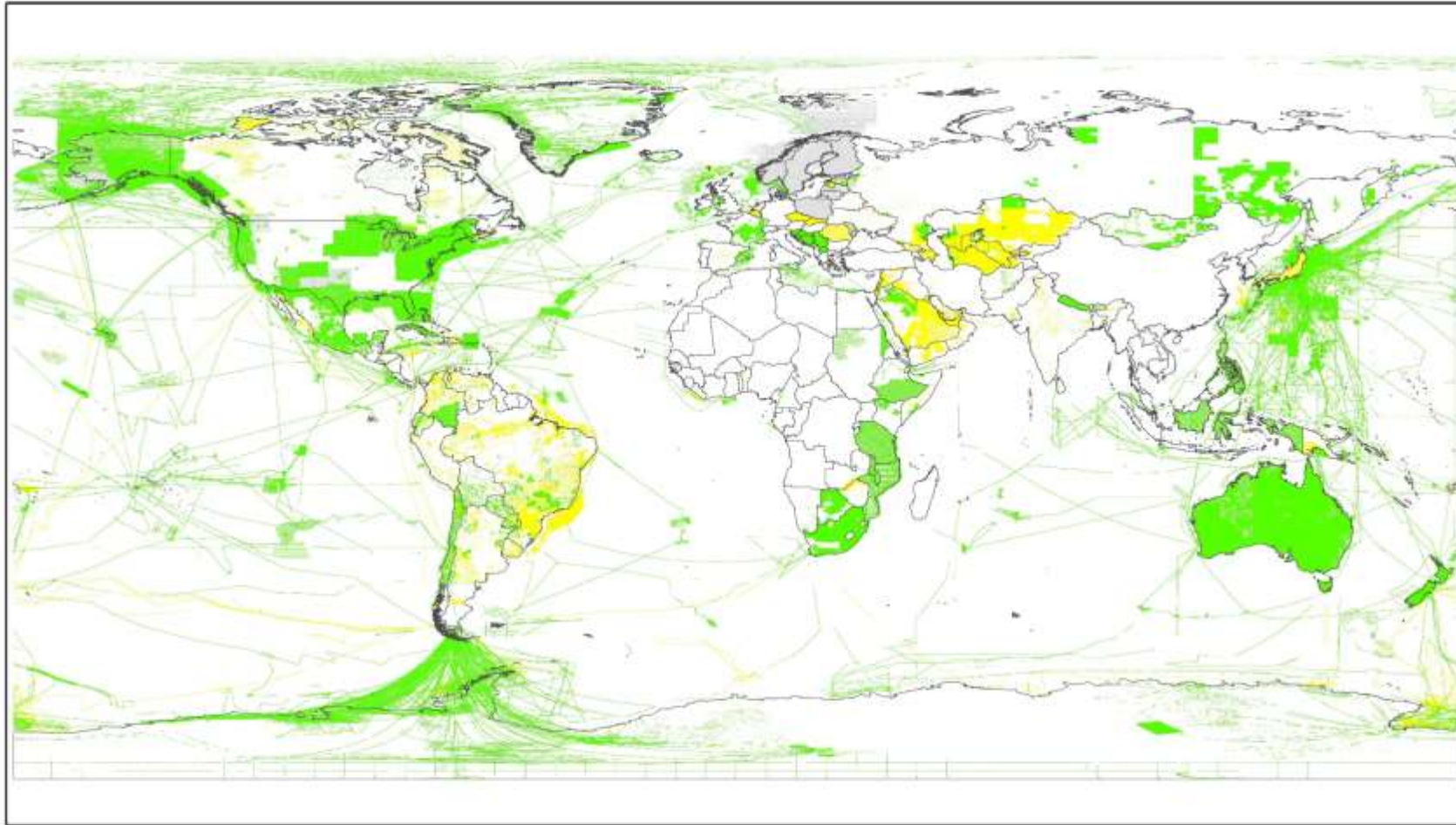


All NGS GRAV-D airborne data currently available



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**New and Evaluated Data Since 01-APR-2008
Current as of 05-SEPT-2019 : 5'x5' Representation**



Australia and many Scandinavian countries have sent us their improved national data sets.

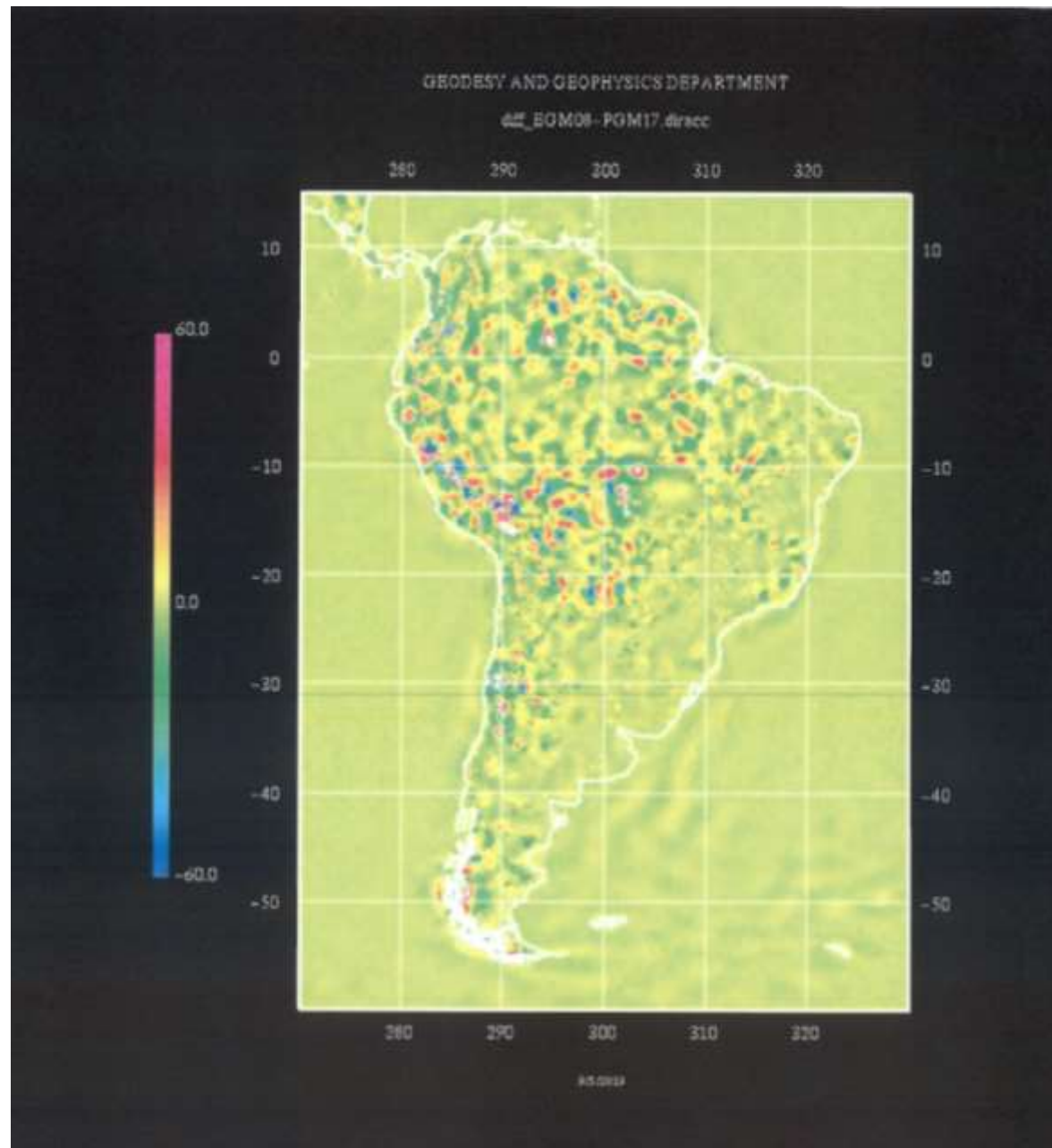
 **New**

 **Evaluated**

 **Very recent -
in next data pull**

UNCLASSIFIED
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Models from Satellite:

GOCO06S: satellite only solution to 250

Gravity missions:

GRACE, GRACE-FO

GOCE

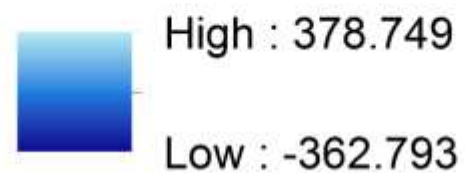
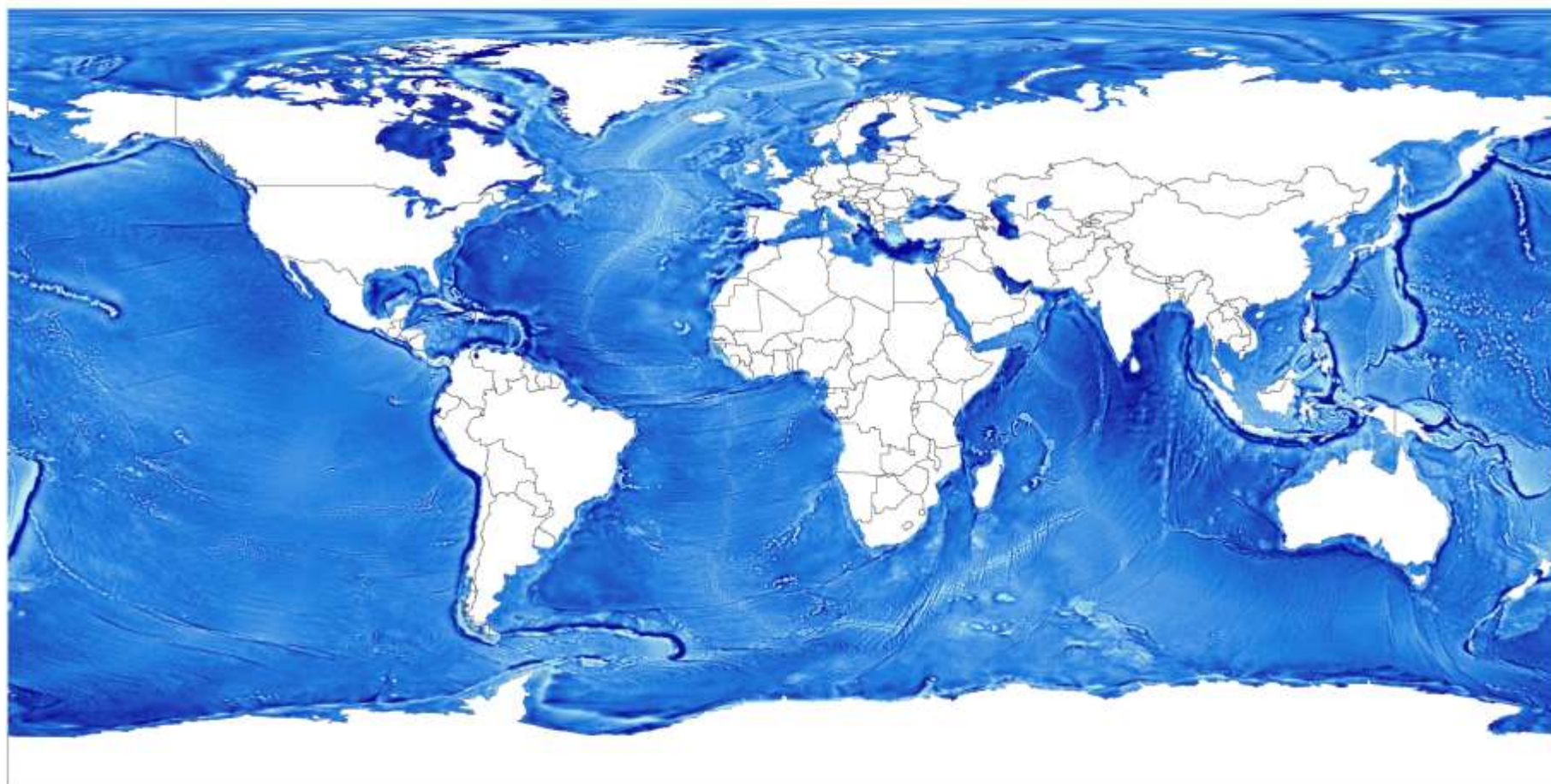
Altimetry:

Sandwell & Smith v28 ...

DTU15, DTU17, ...

NGA Hybrid Model

DTU15/DTU17/SANDWELL V26 HYBRID 5 minute averaged free air anomalies



► How does this help?

An improved Altimetry solutions reduces the edge effects between land and water interface thereby improving the model.

► Ongoing Efforts for 2019/2020

Moving Forward

- GRAV-D final set for EGM2020
- Final error modeling for the final EGM
- Incorporating DTU15,17/Sandwell & Smith 26,
- Incorporating final data sets
 - Baltic states, Poland, ... others?
- IAG Review/results incorporated
- Final IAG Review

If you would like to be a part of this EGM effort, please contact

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THANK YOU



► Graphics acknowledgements

- Slide 8 Internal NGA Graphic
- Slide 9 Internal NGA photo - Surveys
- Slide 10 Internal NGA photo
- Slide 11 Internal NGA graphic
- Slide 12 Internal NGA graphic
- Slide 13 Internal NGA graphic
- Slide 15 Internal NGA graphic