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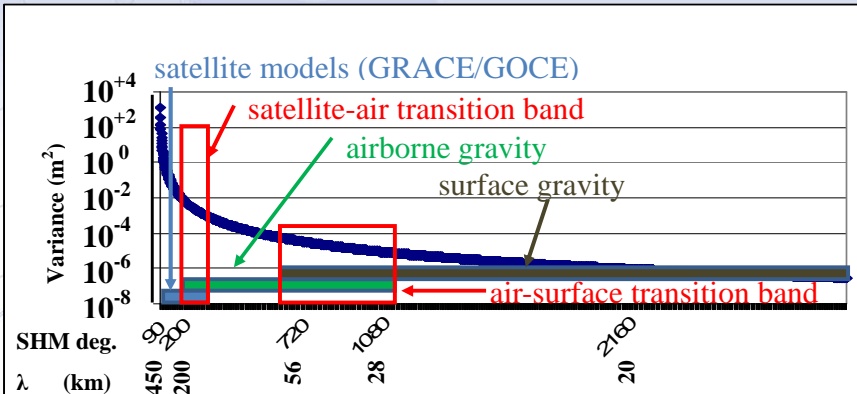
Using Aerogravity to Produce a Refined Vertical Datum

D.R. Roman and X. Li

XXV FIG Congress
16-21 June 2014
Kuala Lumpur, Malaysia
Session TS01A, Paper 7303

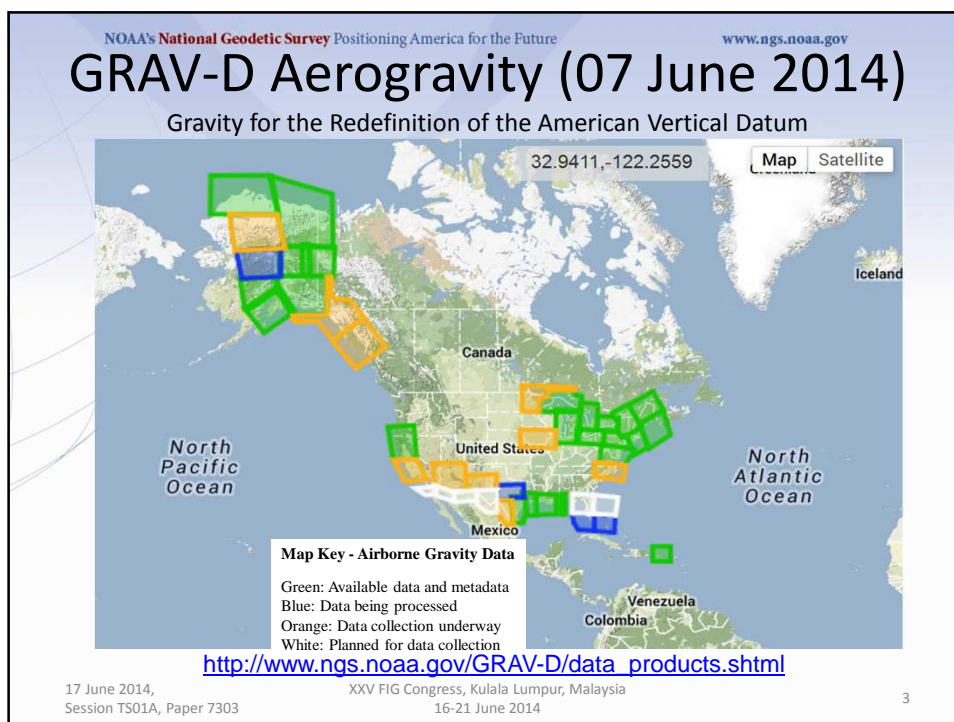
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Gravity Field Power Spectrum



Power Spectrum plot of gravity field (blue line). Most power is at longest wavelengths (λ) at left on the lowest degree harmonics, where satellite (light blue bar) data dominate. Surface data (brown bar) contain the shortest to the right. Aerogravity (green bar) overlaps both parts of spectrum (red boxes).

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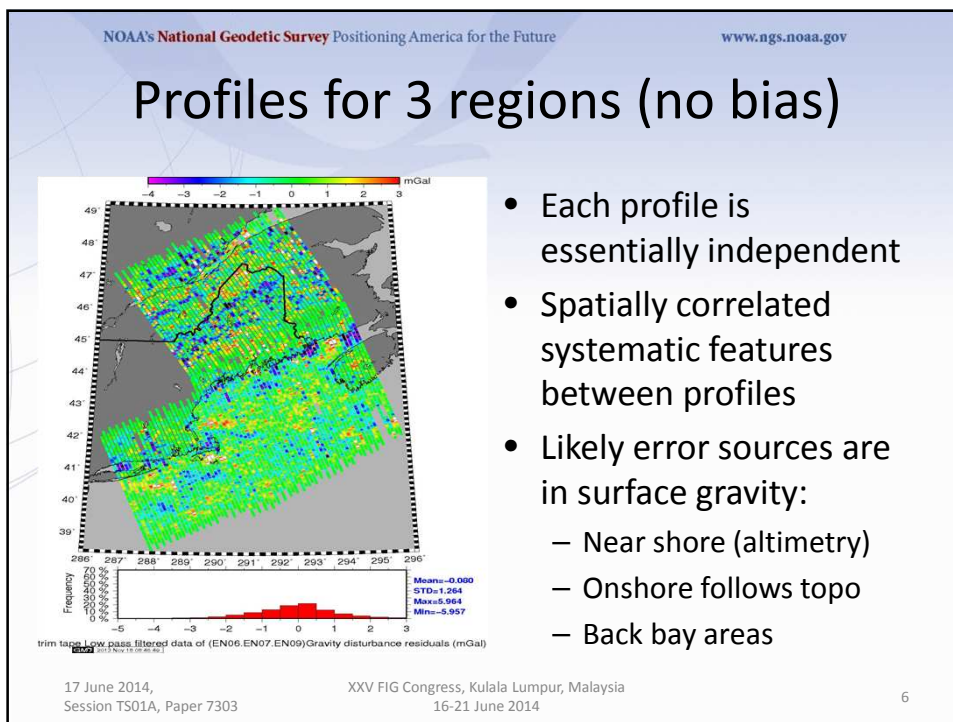
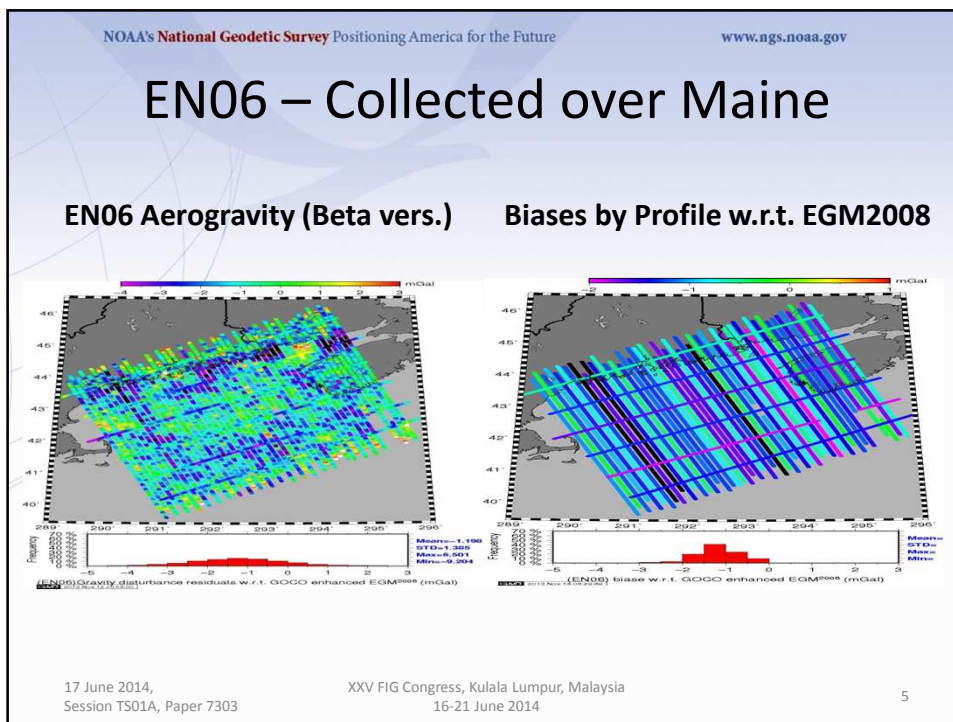


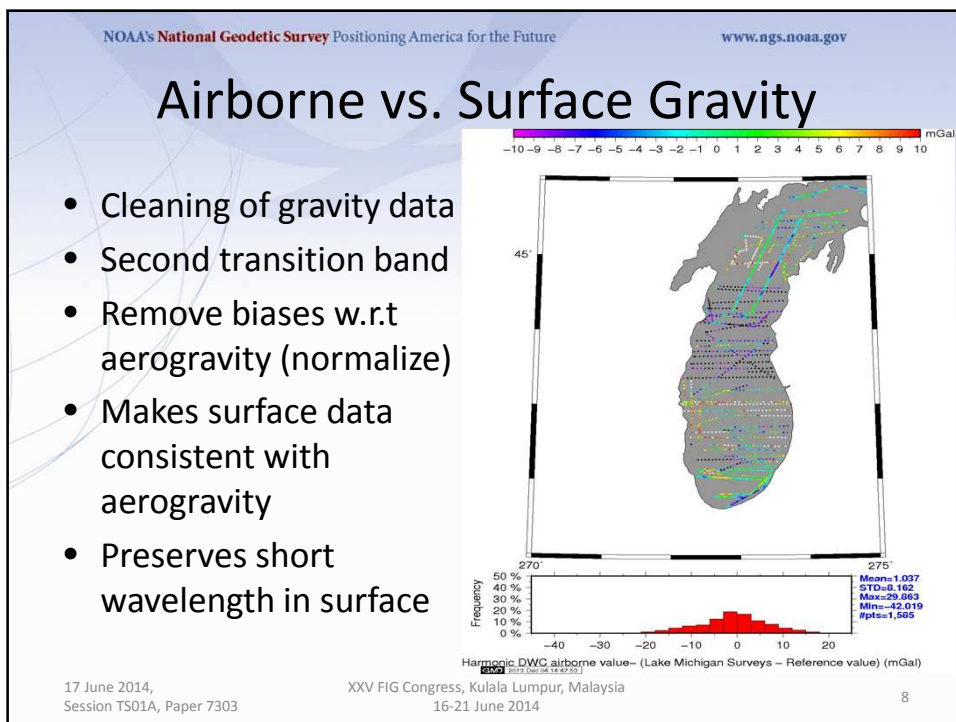
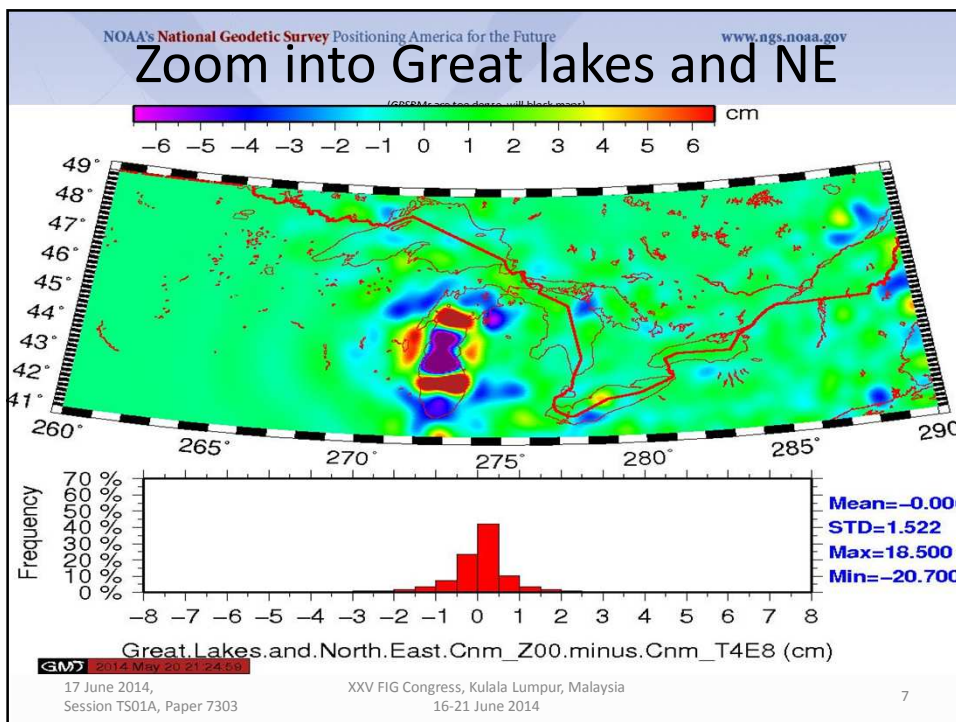
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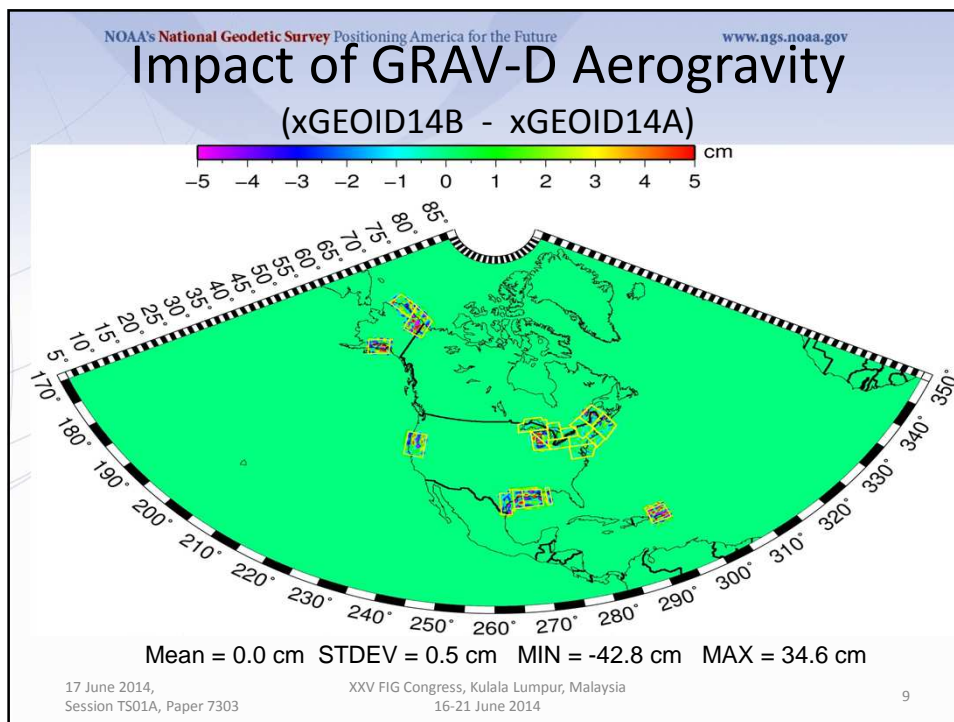
GRAV-D Aerogravity Collection

- Aircraft: rotating between King Air, Pilatus, P-3
- Equipment: GPS, IMU, & gravity meters
- Data sampling: 1 Hz
- Nominal Flight elevation: 6.1 km (20 kft)
- Nominal air speed: 407 kmh (220 knots)
- Track spacing: 10 km track (50 km crossovers)
- Typical block: 400 x 500 km (41 profiles)
- Nominal spectral band: 20-400 km

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unit	Cnm_T (Ref)	Cnm_Z00 (Ref+Airborn)	Ref+Airborn+Surface No.AK.XGeoid14B	
cm	std	std	std	#points
Gulf Coast	9.93	9.26	9.23(240)	482
PRVI	11.70	10.37	10.49(240) 10.25(480)	57
Great Lakes	10.72	10.68	10.56(240)	2116
North East	3.81	2.99	3.30(240) 3.19(360) 3.04(480) 2.97(600)	168 (Altimetry problem ?)
GSVS11	1.86	1.08	1.37 (240) 1.07(480)	218
CA11 (45N,36N,234W,241W)	11.64	11.27	11.21(240)	581
Lake Michigan (47N,40N,270W,278W)	7.55	7.48	7.44(240)	1777

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Outlook

- 30 June 2014 Beta release of xGEOID14A/B
- Look for links on the NGS Main or GEOID pages
- Incorporates aerogravity from 20 regions
- First experimental model using aerogravity
- Annual releases to follow (roughly same time)
- Data cleaning: 2,000,000 surface gravity in 1400 different surveys
- Eventual usage as vertical datum in 2022

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- Relevant NGS webpages:
 - Geoid Page: <http://www.ngs.noaa.gov/GEOID/>
 - GRAV-D: <http://www.ngs.noaa.gov/GRAV-D/>

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