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"Geospatial Information for a Smarter Life and Environmental Resilience"

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GEOID18: Last U.S. Hybrid Geoid Prior to NAPGD2022

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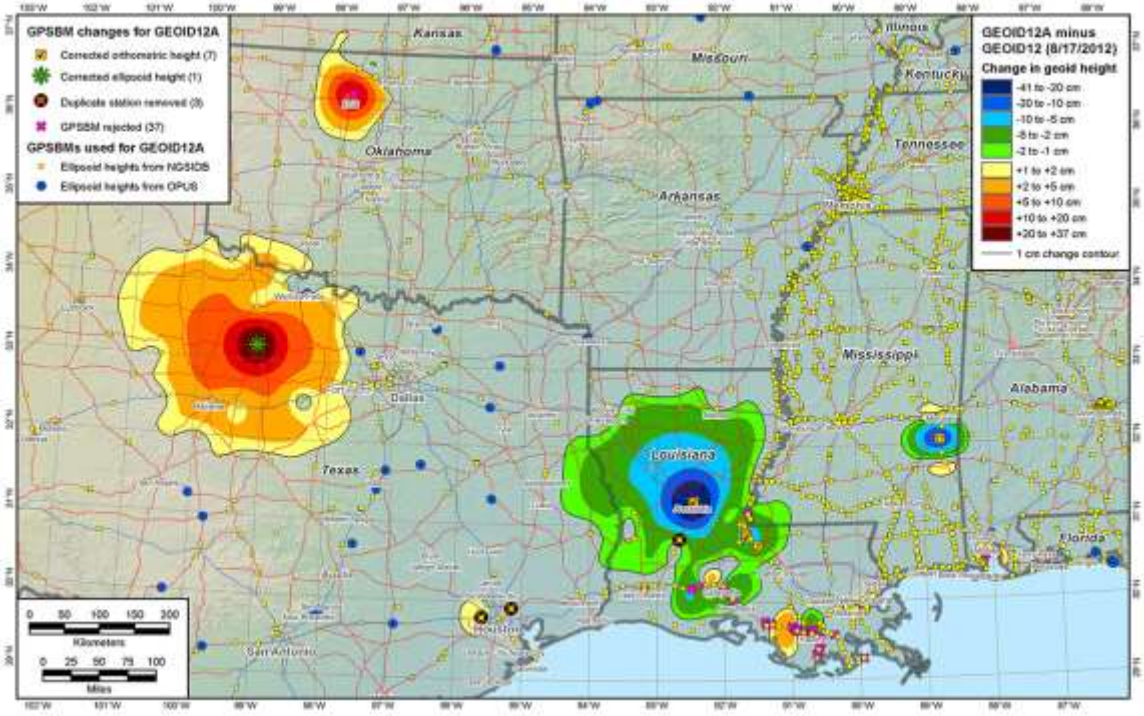
Paper 9933

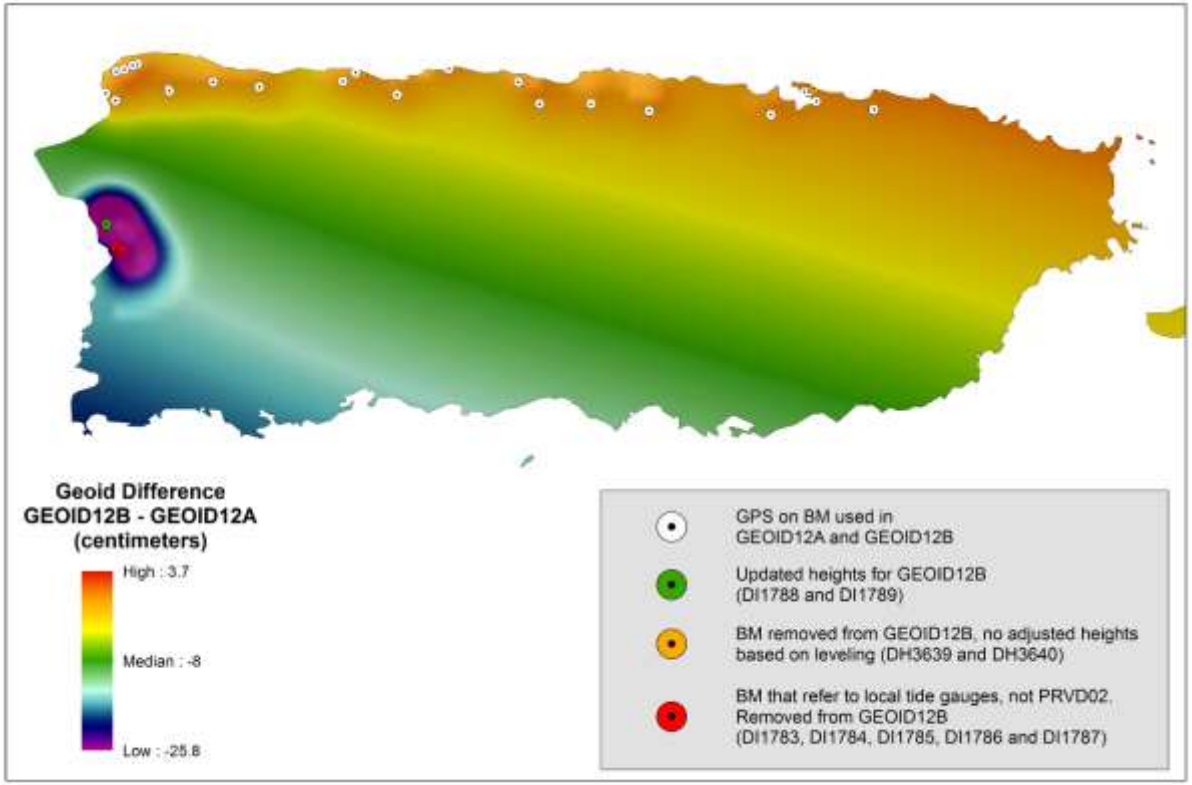
OUTLINE

- GEOID12 – lessons learned
- Hybrid Geoid modeling primer
- GPS on BM 18 planning and collection
- Expected changes in GEOID18
- Summary

Differences Between GEODI12A and GEOID12



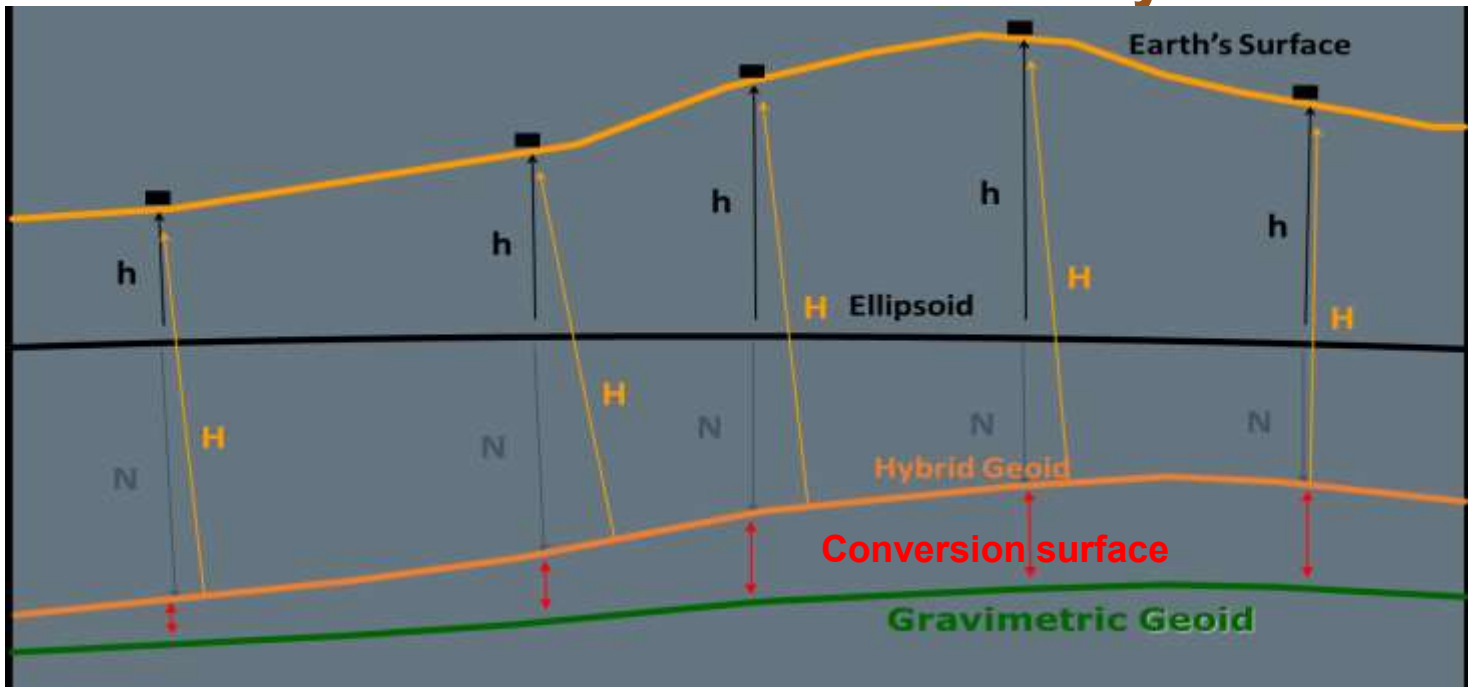
Differences Between GEOID12B and GEOID12A



Hybrid Geoid Modeling Primer

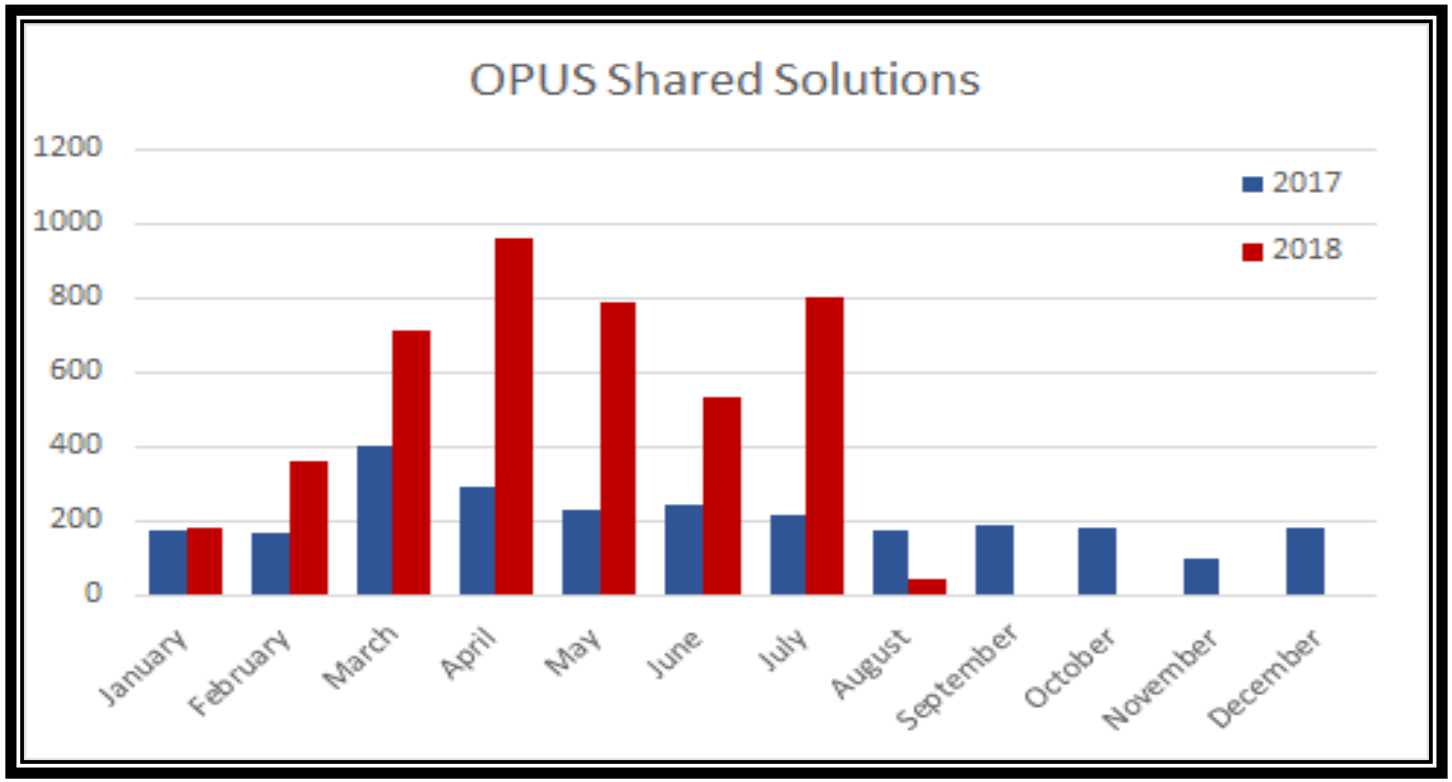
- Start with a gravimetric geoid (USGG2012)
- Use control data to fit to local datums
- Appropriate versions of NAD 83
- Respective local Vertical Datum (if one exists)
- Use LSC to determine correlated signal
- For complex areas (e.g., CONUS), use MMLSC
- Apply grid of correlated signal to USGG2012
- Results in GEOID12 with high frequency nature from USGG2012 but fit to local control

Conversion Surface: From Gravimetric to Hybrid Geoids

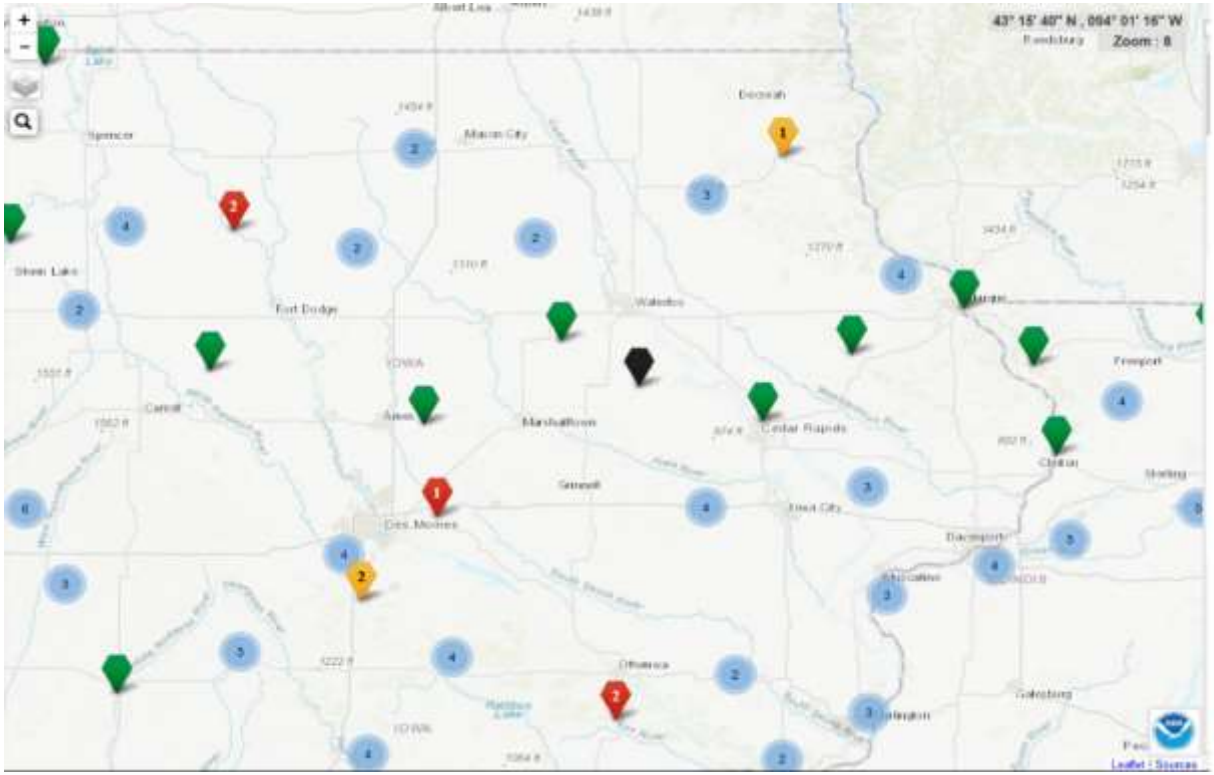


Gravimetric Geoid systematic misfit to BM's but best fits "true" heights
Hybrid Geoid "converted" to fit local BM's, so best fits NAVD 88 heights
Conversion Surface model of systematic misfit derived from BM's in IDB

OPUS-Shared Solutions

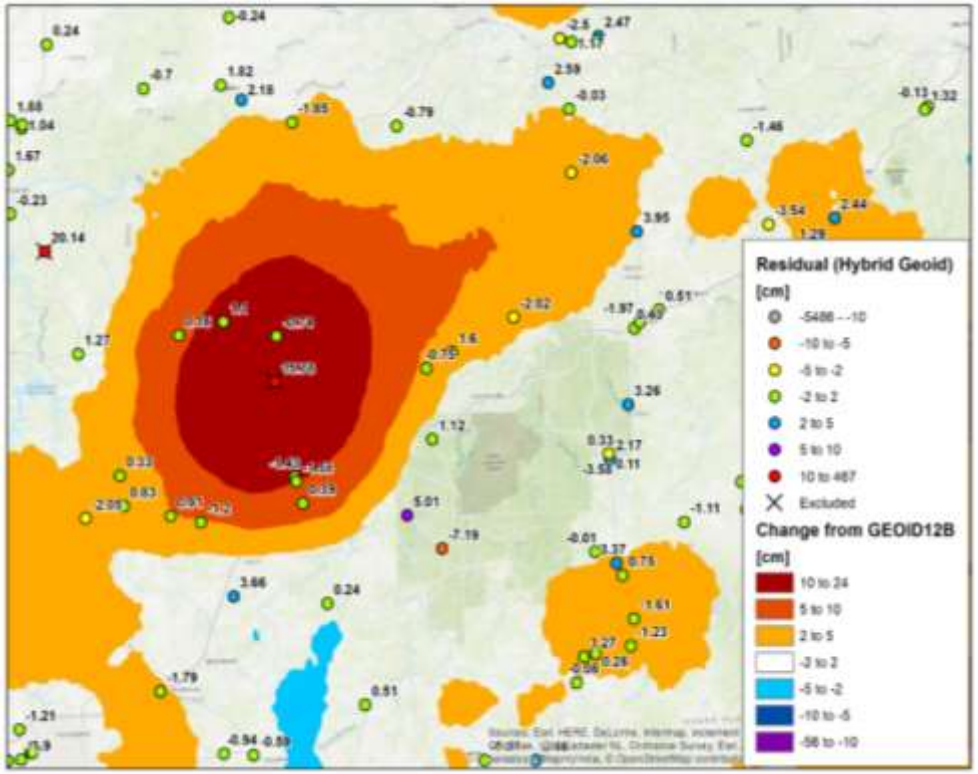


Sample plot showing regions to be targeted for collection.

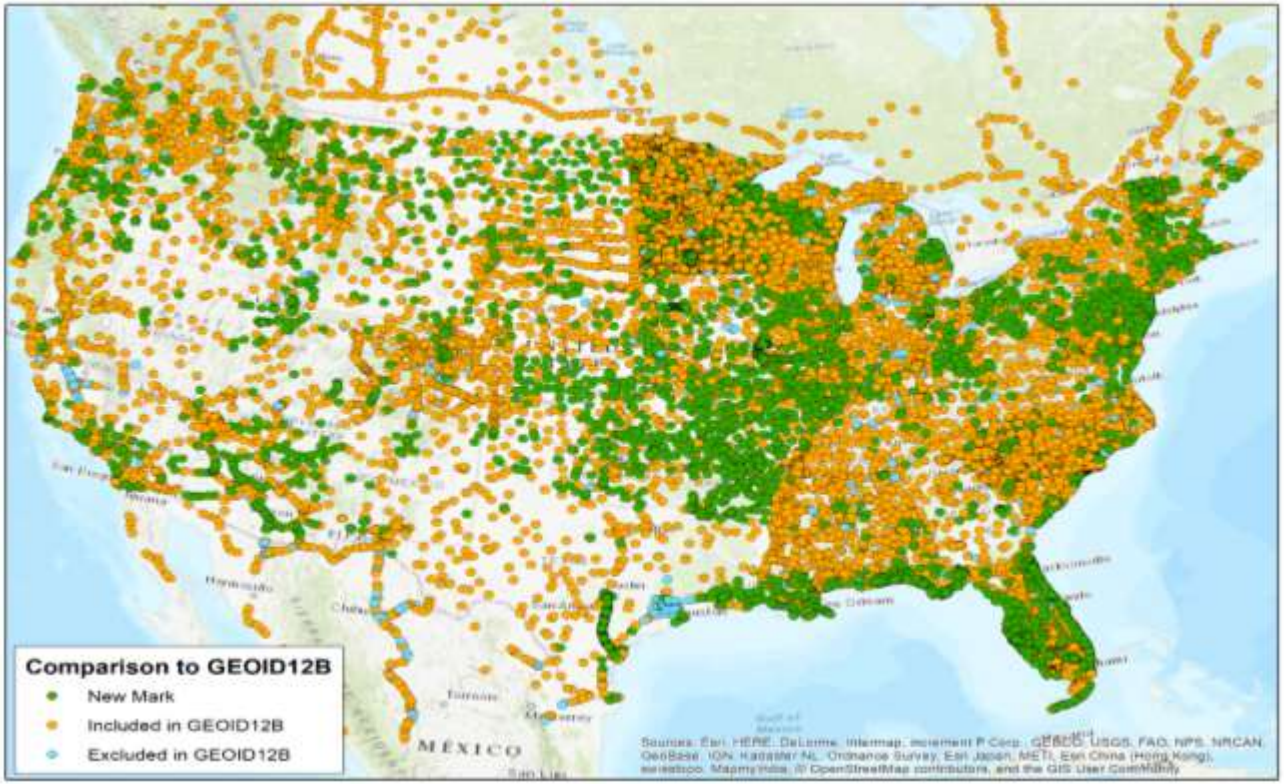


Example point where suspect control data was revisited.

PID HD0371



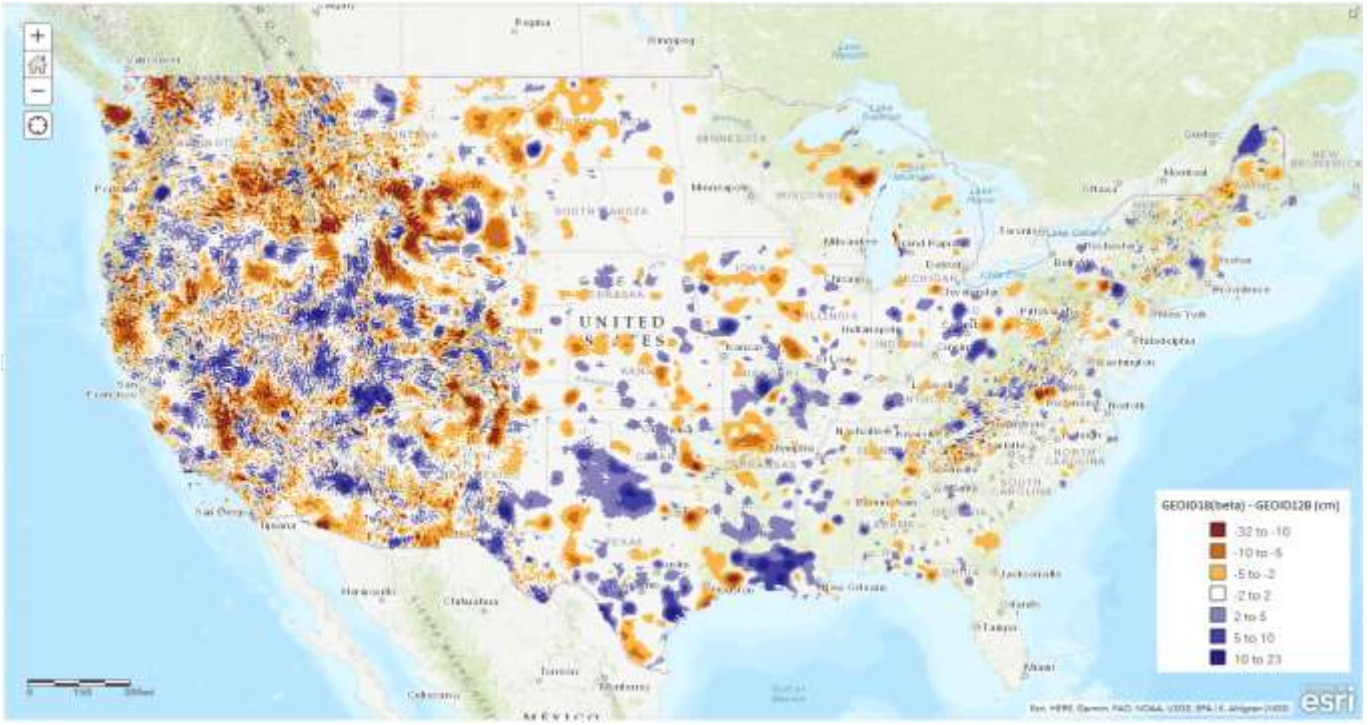
Location of Control Data (GPS on BM) used in GEOID18



Control data (GPS on BM) used in making GEODI18

GPS on BM	Available	Flagged as bad fit	Used in Model	Number since GEOID12B	Used since GEOID12B
NGS IDB:	30,128	1,987 (6.6%)	28,141	6,610	6,324
OPUS Share: 2+ Obs.	3,313	288 (8.7%)	3,025	3,009	2,748
OPUS Share: 1 Obs.	2,349	-	211	2,141	186
Canada	579	14	565	0	0
Mexico	247	41	206	0	0
Total:	36,616	2,330	32,148	11,760	9,258

Differences Between GEODI18 and GEOID12B



Summary

- Generation of GEOID12/A/B resulted lessons learned
- A much more careful analysis followed
  - Analysis of the leveling in comparison to neighbors
  - Analysis of residual values at GPS on BM
- A campaign followed on that targeting areas of deficiency
- Resulting model is much improved and strengthened
- This is the last hybrid model before NAPGD2022 will replace it
- The GPS on BM data collected here will go into follow on vertical datum conversion tool

Questions?

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