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Beyond GEOID12: Implementing a New Vertical Datum for North America

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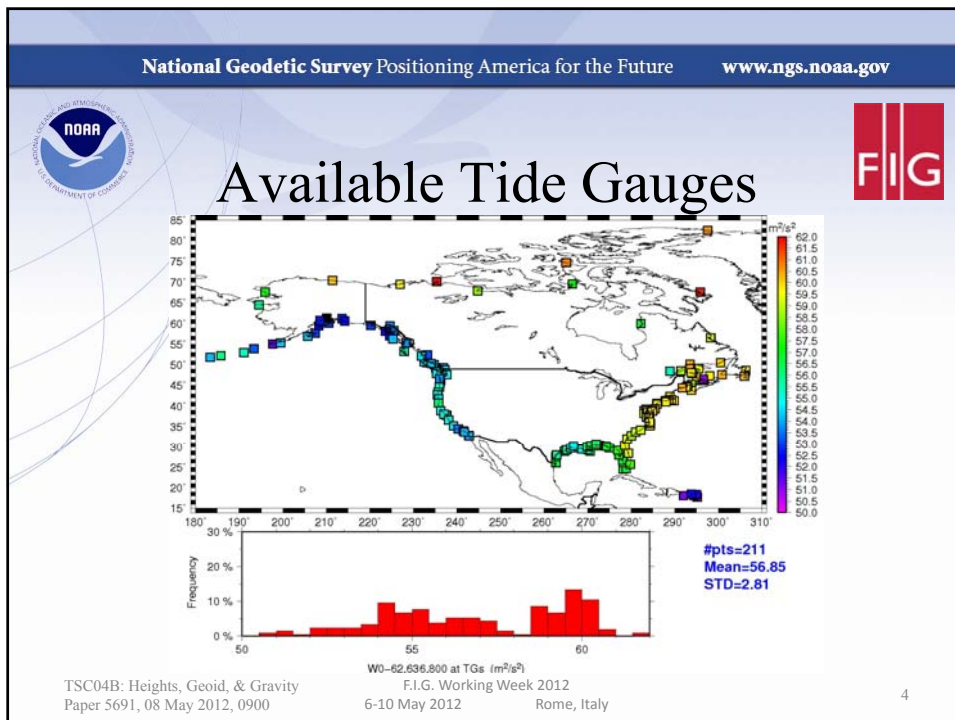
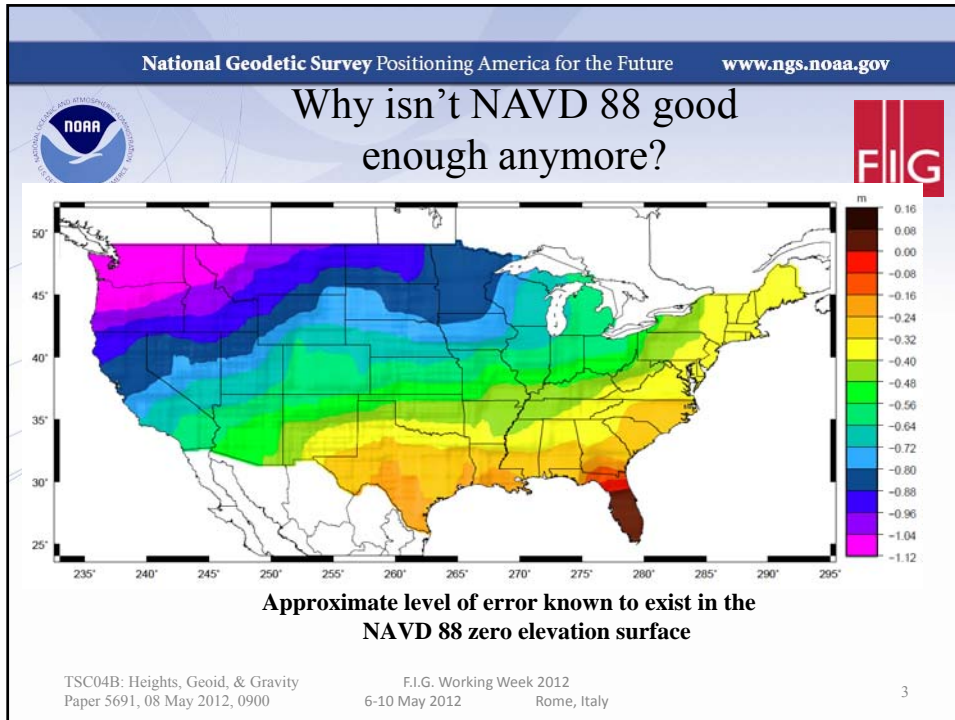
Outline

- Why isn't NAVD 88 good enough anymore?
- Selection of a datum surface (W_0)
 - Tide gauges
 - SST/MODT
- Aerogravity coverage
- Summary


TSC04B: Heights, Geoid, & Gravity
Paper 5691, 08 May 2012, 0900

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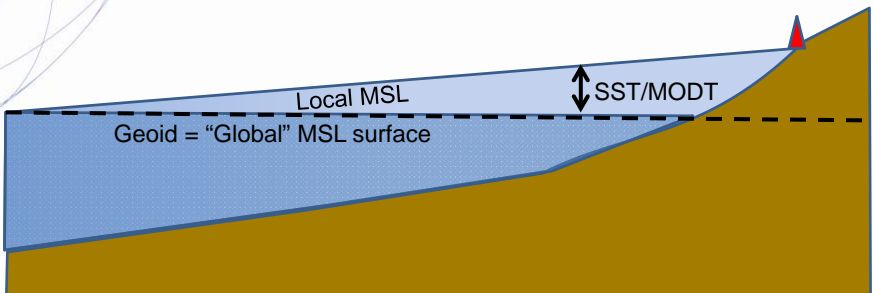
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SST, TBM's and the Geoid



- $P, T, S \neq \text{constant/uniform}$
- Geoid + SST = LMSL (as seen at tide gauge)




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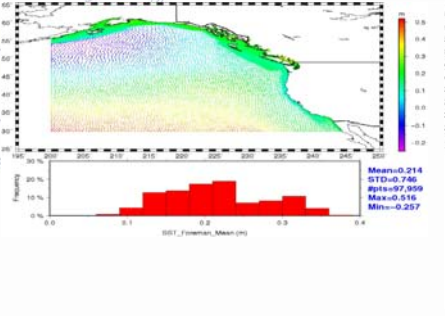
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SST (MODT) Models

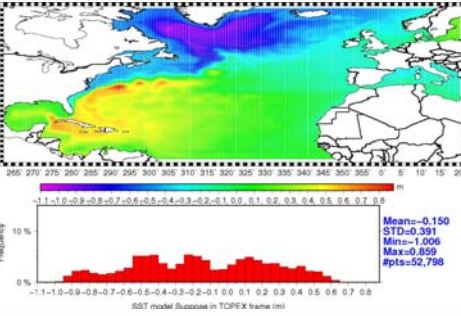


Foreman et al. 2004



Mean=0.214
STD=0.746
#pts=97,959
Max=0.516
Min=-0.287

Thompson-Demiorov 2006

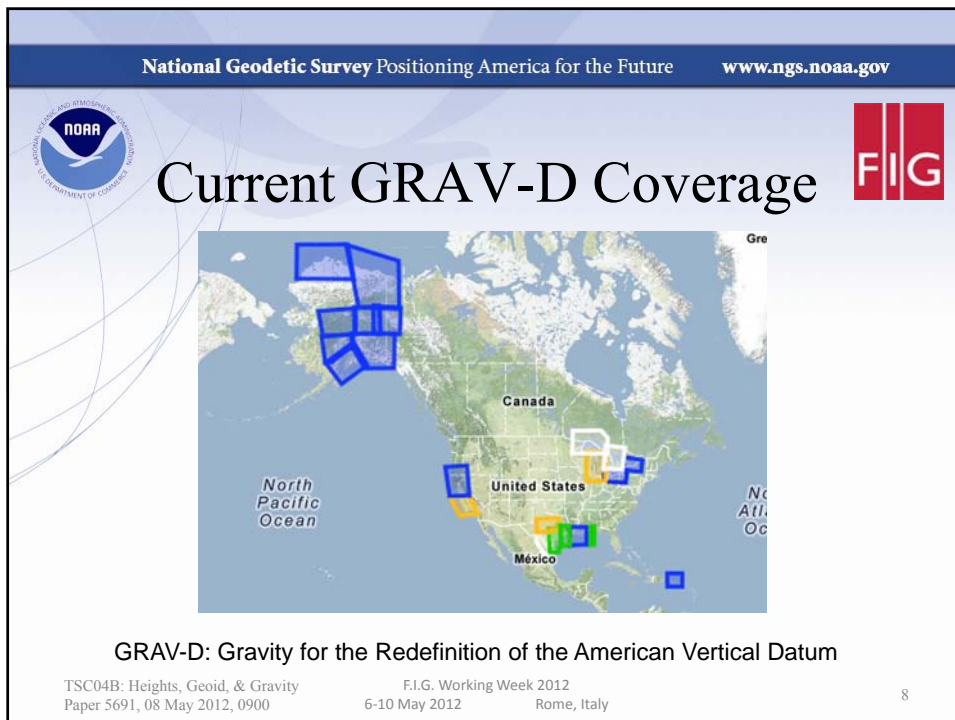
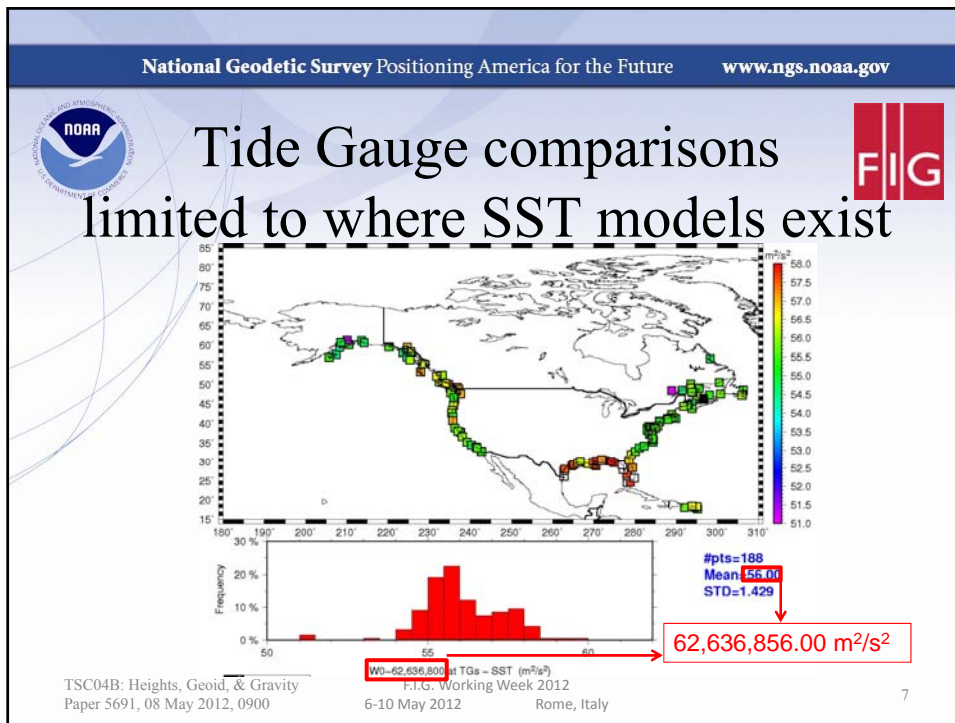


Mean=-0.150
STD=0.391
Min=-1.006
Max=0.859
#pts=52,798



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Summary



- NAVD 88 is insufficient to meet cm-level needs
- Must use highly accurate gravimetric geoid
- New W_0 best fits most Tide Gauges
 - SST models remove significant variability in LMSL
 - Same W_0 value adopted by IAU and IERS
 - Neglects Arctic but also Mexico & Caribbean

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Summary

- U.S.A & Canada have agreed to use this W_0
 - Will serve as Canadian Vertical Datum in 2013
 - It is the likely value for U.S. in 2022
- GRAV-D aerogravity will bridge gap
 - Satellite gravity models will provide unification
 - Surface gravity & DEM's give high frequency
 - Aim is for cm-level accuracy in geoid and GNSS

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