Thoughts on the Diurnal/Semidiurnal EOP Model

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Current (IERS'96) model: "Model C" from Chao et al. (JGR, 1996), =

Global TPXO.2 model (Egbert et al., JGR, 1994) +

Arctic hydrodynamic model (Ray et al., JoG, 1997).

Should IERS'96 tidal EOP model be updated?

- Current model was based on only ~1 year of Topex/Poseidon data. We now have ~15 years of T/P + Jason data, plus GFO and ERS data in higher latitudes.
- New global tidal models are much improved over the TPXO.2 model — at least for tidal elevations. (see next page)
- New models probably more accurate in Arctic & Antarctic Oceans (higher spatial resolution, better bathymetry).
- A tidal model for EOP also requires global current velocity, but...

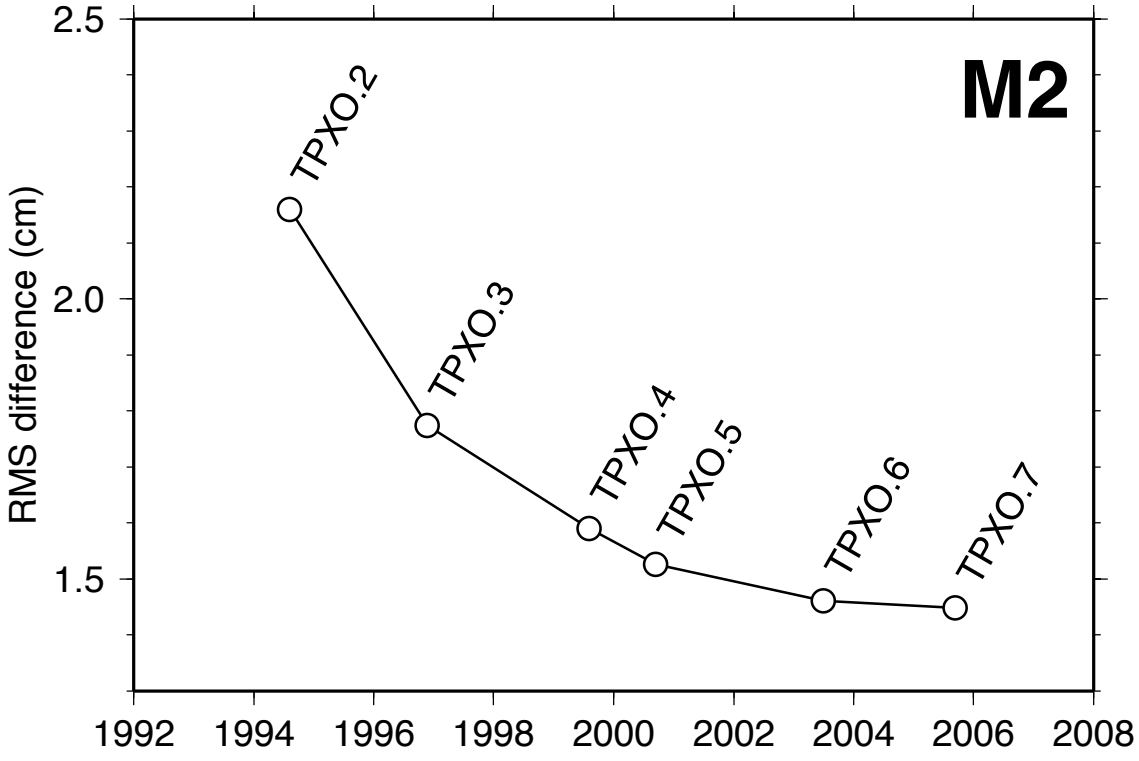
  Few such models are available. — Recent examples: TPXO.7, GOT4.7
- Do new models better predict EOP?

  Hard to say. (see following)

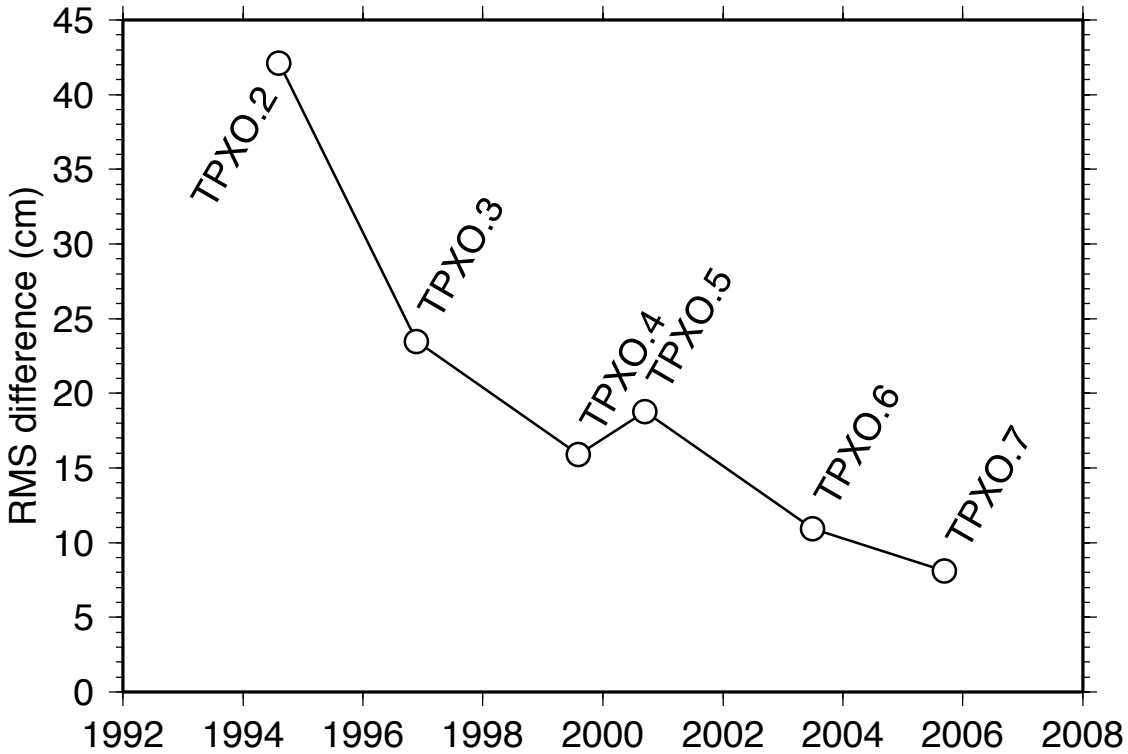
- What about S1,S2 air-tide contributions? — De Viron et al (JGR, 2005) show large inconsistencies between air-tide models.
- Ocean response to S1 air tide is available from Ray & Egbert (JPO, 2004).

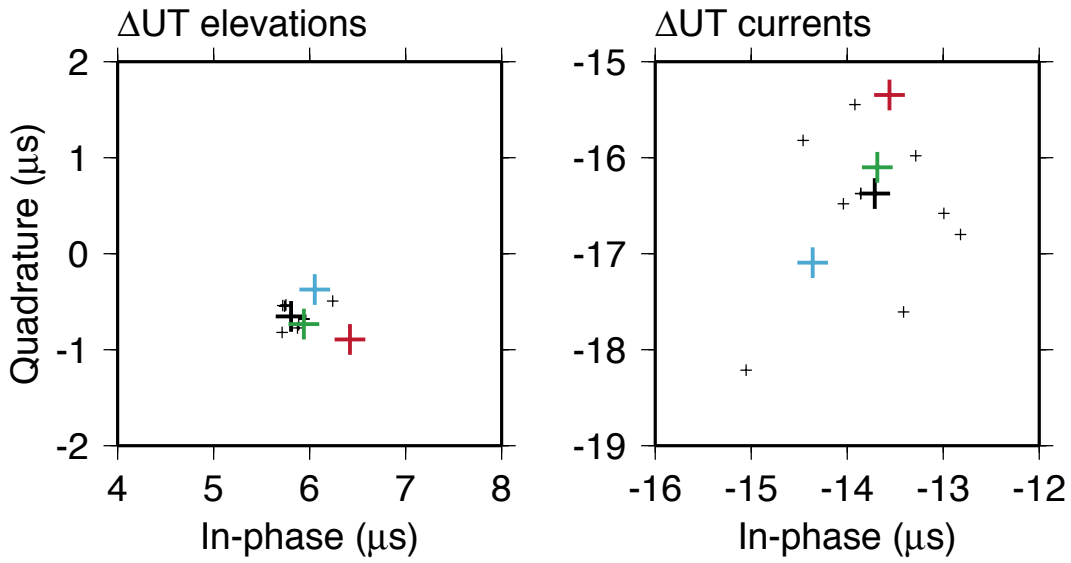
History of TPXO.*n* M2 global tide solutions

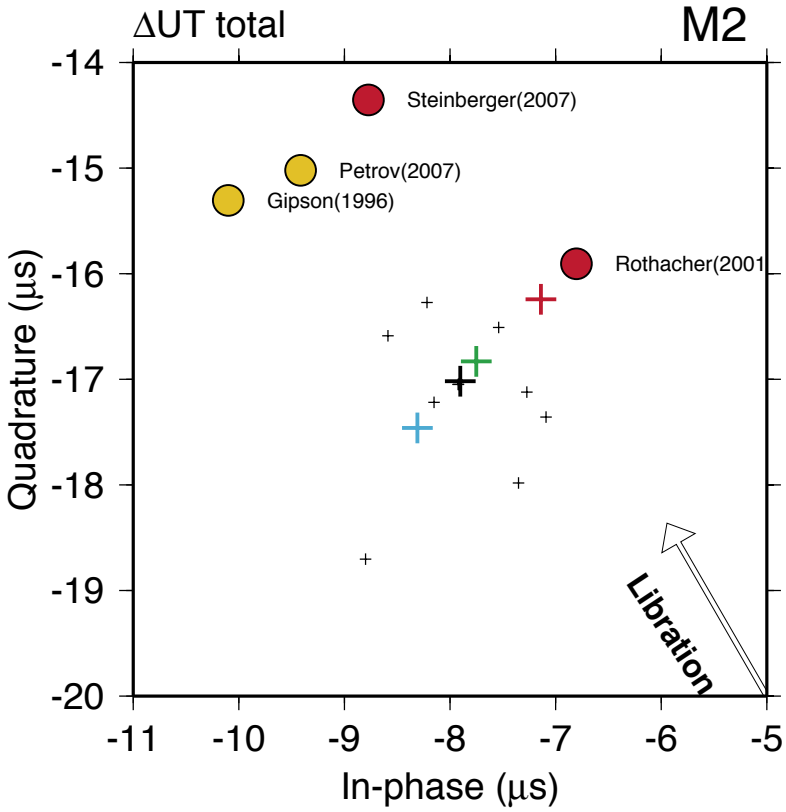
102 deep-water stations



114 shallow-water stations
(not final set)

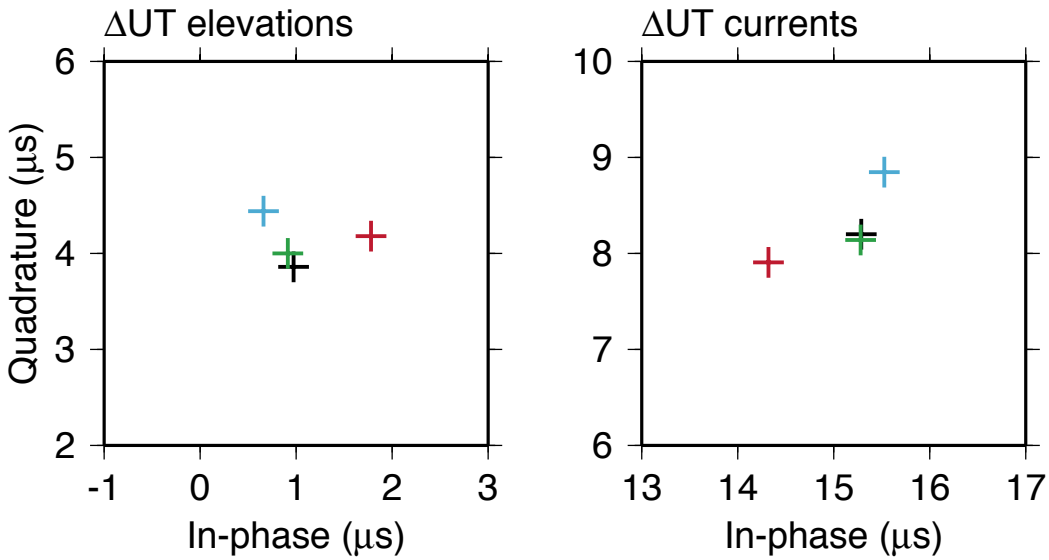


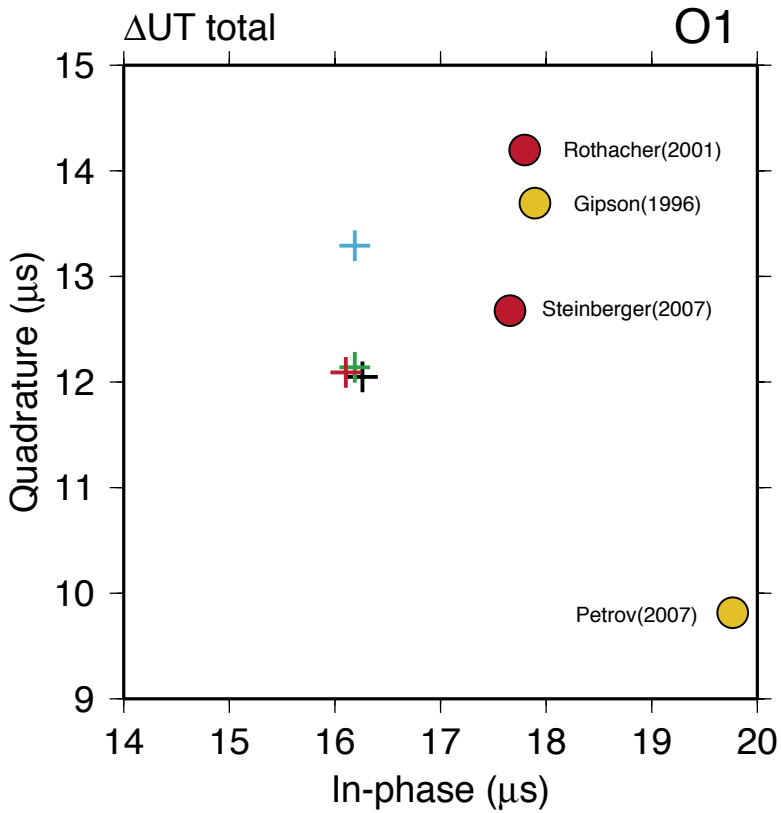




+ **IERS(1996)**
+ **TPXO.6.2**
+ **TPXO.7**
+ **GOT4.7**

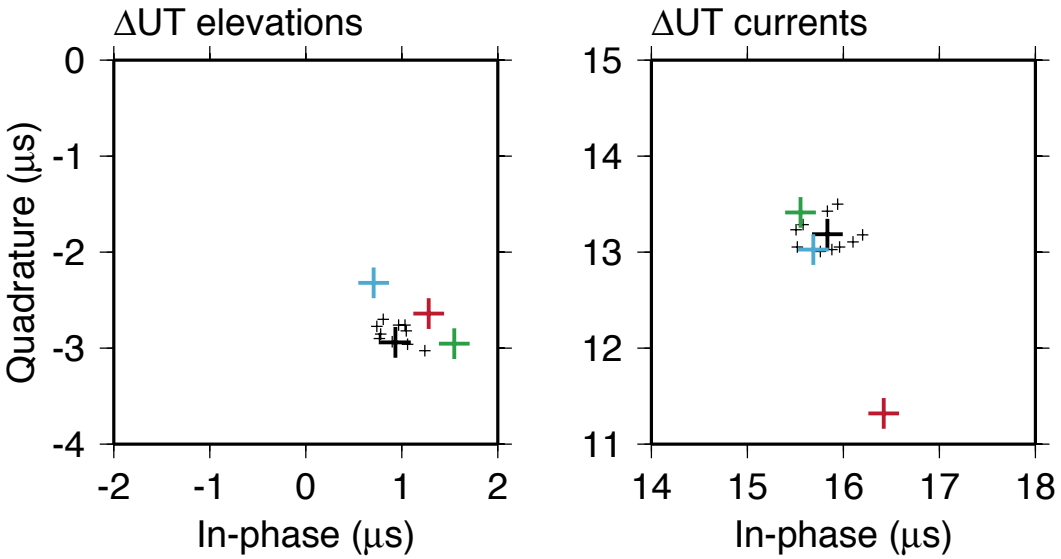
NOTE: New geodetic measurements ≈ ocean models + Libration

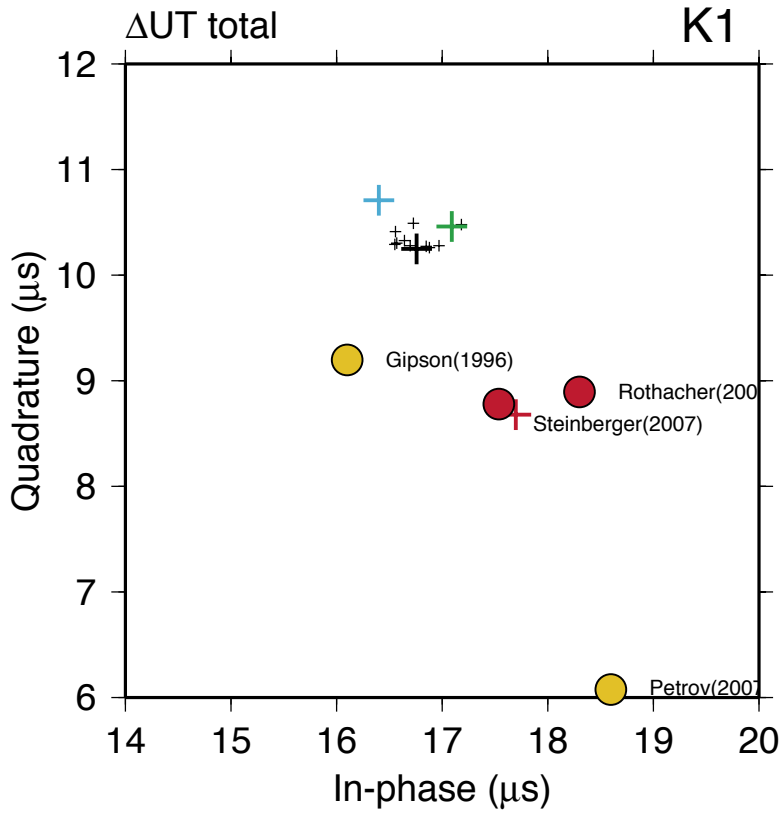




IERS(1996)
TPXO.6.2
TPXO.7
GOT4.7

	Amp (μs)	Phase
Gipson	**22.5**	**37.4°**
Rothacher	**22.8**	**38.6°**
Steinberger	**21.7**	**35.7°**
Petrov	**22.1**	**26.4°**





IERS(1996)
TPXO.6.2
TPXO.7
GOT4.7

	Amp (μs)	Phase
Gipson	**18.5**	**29.7°**
Rothacher	**20.3**	**25.9°**
Steinberger	**19.6**	**26.6°**
Petrov	**19.6**	**18.4°**

Should IERS'96 tidal EOP model be updated?

Adopt an ocean-tide model (as now) or one of the geodetic estimates?

Geodetic EOP estimates disagree among themselves and with ocean models for O1, K1.

M2 (both measured and modeled) appears satisfactory to within error bars.