

Orbit test comparisons

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Generated Solutions

- Three different integrations were performed
- Results were given in both ECI and ECF (velocities in SP3 optional, not needed)
 1. Basic model
 - Label: [ACid]_[eci/ecf]_wot.sp3
 - Example: esoc_eci_wot.sp3
 2. Basic model but no Ocean Tides
 - Label: [ACid]_[eci/ecf]_not.sp3
 - Example: esoc_eci_not.sp3
 3. Basic model but no Ocean Tides and No Solid Earth Tides
 - Label: [ACid]_[eci/ecf]_not_nst.sp3
 - Example: esoc_eci_not_nst.sp3

Description of Basic Model (ESOC)

- Gravity field until $n \times n$
 - ESOC: EIGEN-6S2ext, degree and order 12x12
 - C21 and S21 from EIGEN-6S2ext, not based on IERS2010 equation, i.e. not using mean pole
- Effects of Sun and Moon
- Planets
 - ESOC: All including Pluto
- No relativistic corrections
- No SRP, No Earth radiation, No antenna thrust
- Solid Earth tides (not to be used for solution 3)
 - ESOC: IERS2010 elastic Earth model but no pole tide
- Ocean tides (only to be used for solution 1)
 - ESOC: EOT11a, degree and order 12x12
 - 12 largest constituents per degree and order
- No pole tide nor ocean pole tide

Description of Basic Model (JPL)

- Gravity field until $n \times n$
 - JPL: EGM2008, degree and order 12x12
- Effects of Sun and Moon
- Planets
 - JPL: All including Pluto
- No relativistic corrections
- No SRP, No Earth radiation, No antenna thrust
- Solid Earth tides (not to be used for solution 3)
 - JPL: IERS2010
- Ocean tides (only to be used for solution 1)
 - JPL: got4p8acconvdelta+opole_30.txt
- Including pole tide

Description of Basic Model (MIT)

- Gravity field until $n \times n$
 - MIT: EGM2008, degree and order 12x12
- Effects of Sun and Moon
- Planets
 - Only Jupiter and Venus
- No relativistic corrections
- No SRP, No Earth radiation, No antenna thrust
- Solid Earth tides (not to be used for solution 3)
 - JPL: IERS2010
- Ocean tides (only to be used for solution 1)
 - JPL: FES2004
- no pole tide

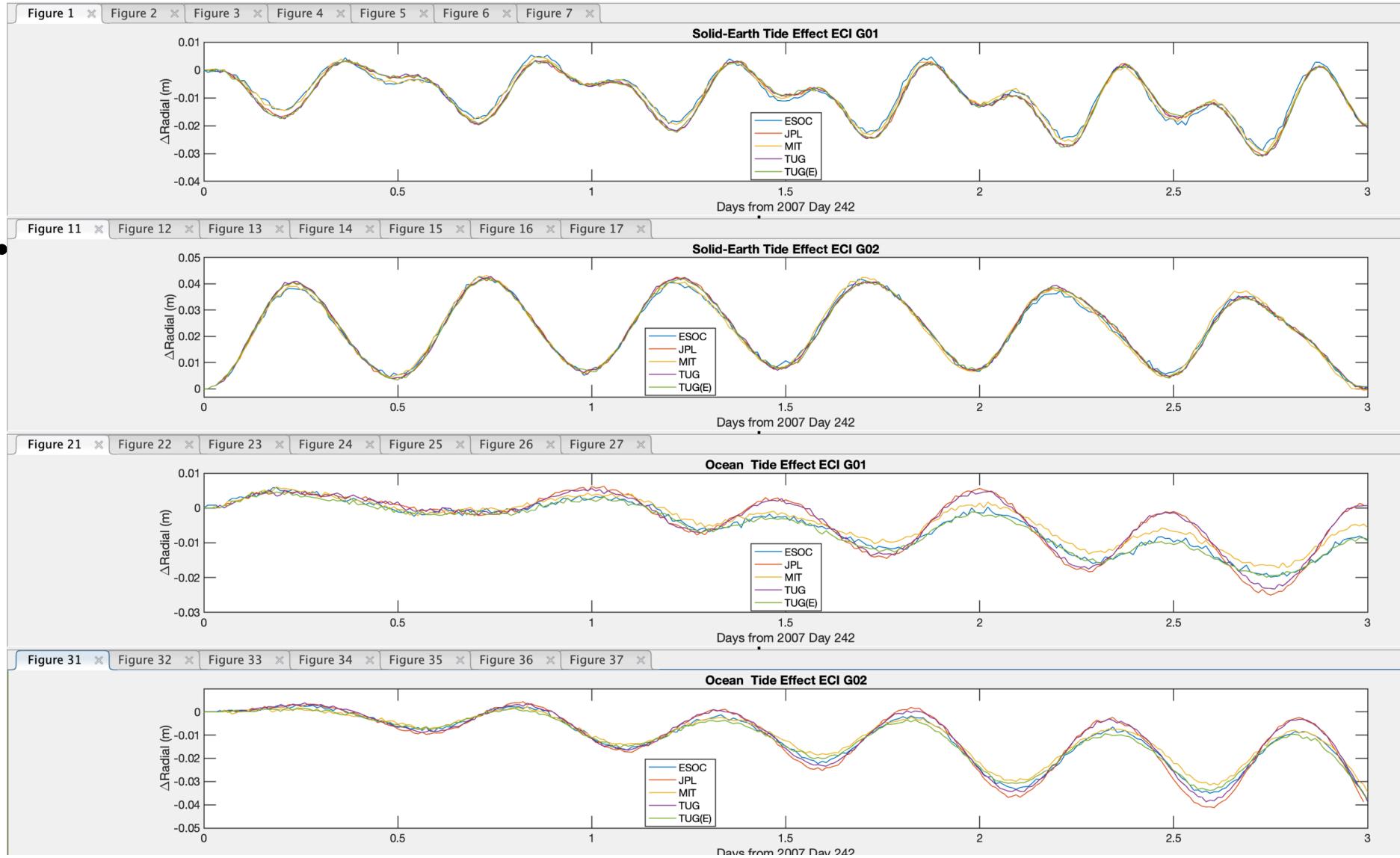
Description of Basic Model (TUG)

- Gravity field until $n \times n$
 - TUG: GOCO05s, degree and order 20x20
- Effects of Sun and Moon
- Planets
 - TUG: All except Uranus, Neptune, Pluto
- No relativistic corrections
- No SRP, No Earth radiation, No antenna thrust
- Solid Earth tides (not to be used for solution 3)
 - TUG: IERS2010 anelastic Earth model
- Ocean tides (only to be used for solution 1)
 - TUG: FES2014b degree and order 10x10
- No pole tide no ocean pole tide
- **TUG(E)** TUG solution run consistent with ESOC.

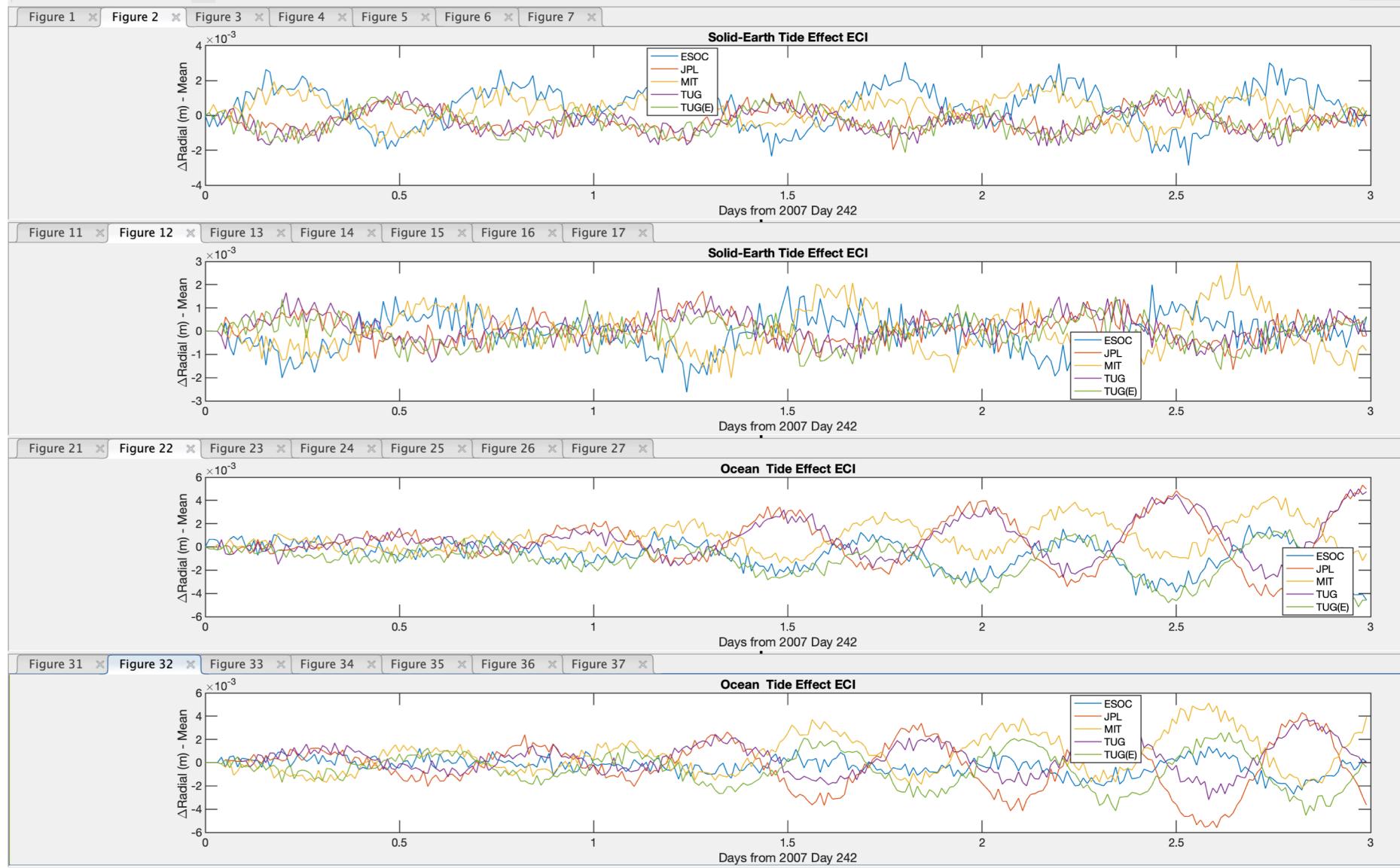
Differences

- Start with differences that each group sees as the impact of
 - solid-earth tide (not minus not_nst solution)
 - Ocean tide (wot minus not solution).
- Look at total effect and then the differences when the mean effect removed.

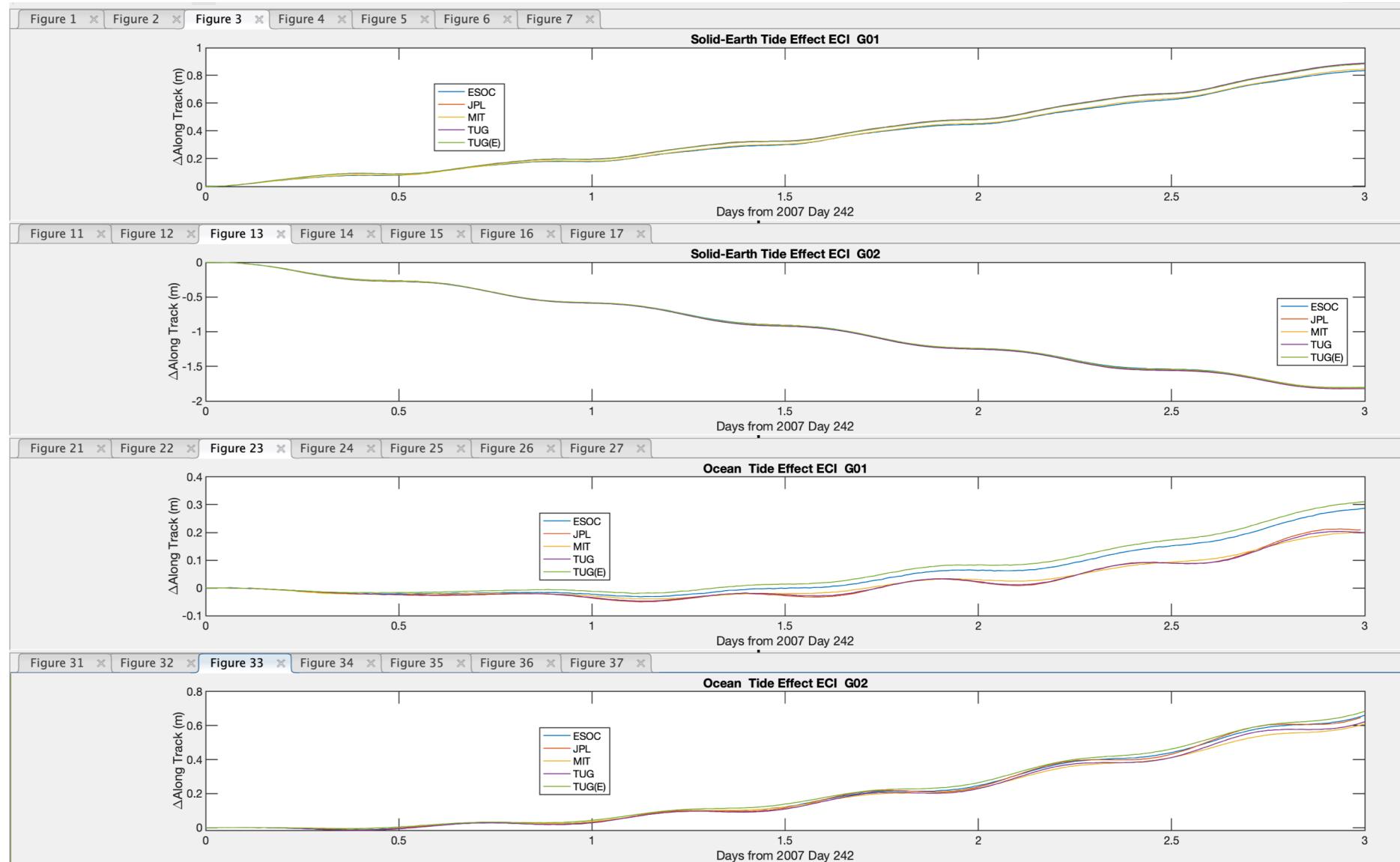
Radial Total



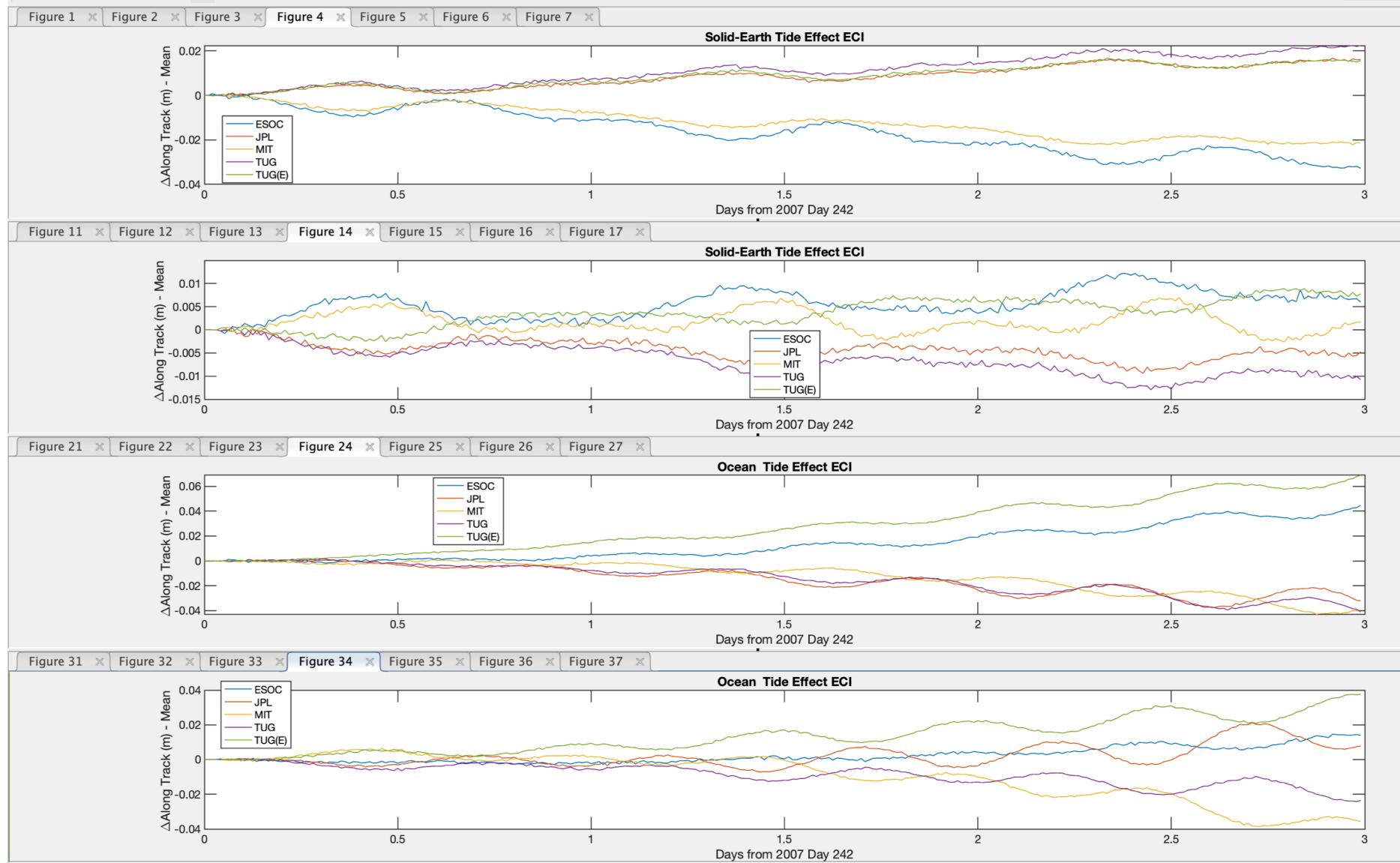
Radial Mean Removed



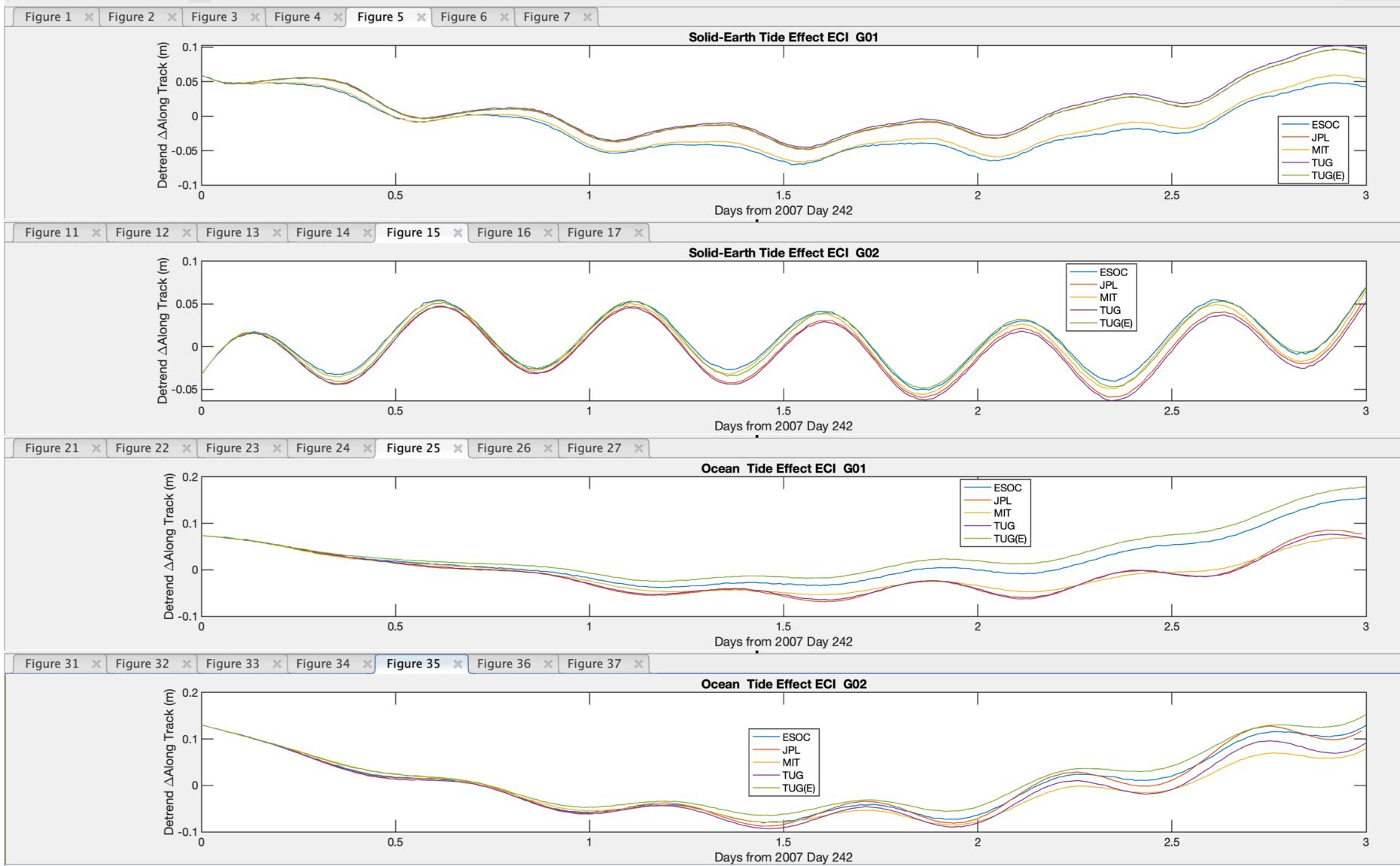
Along Track Total



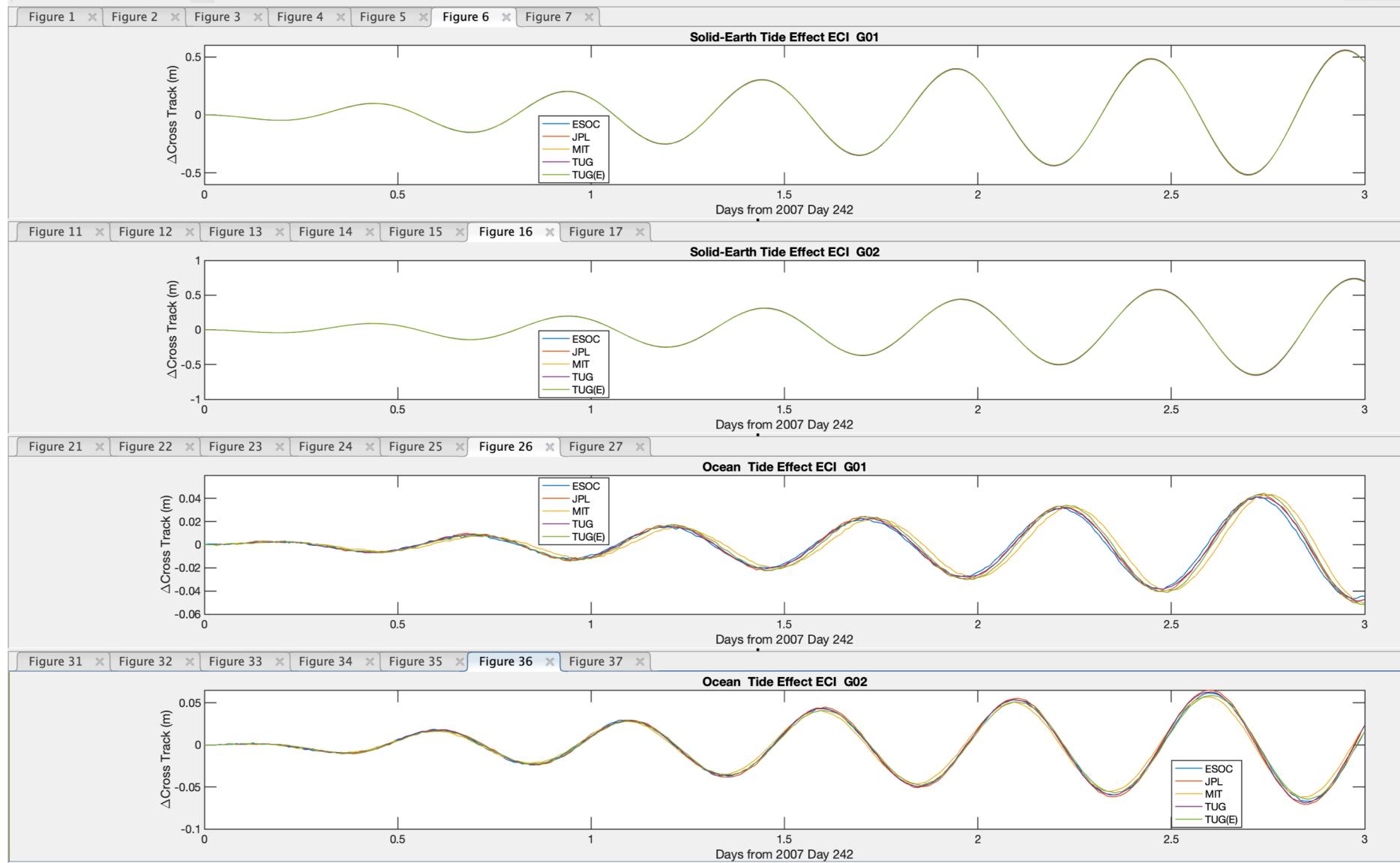
Along Track Mean Removed



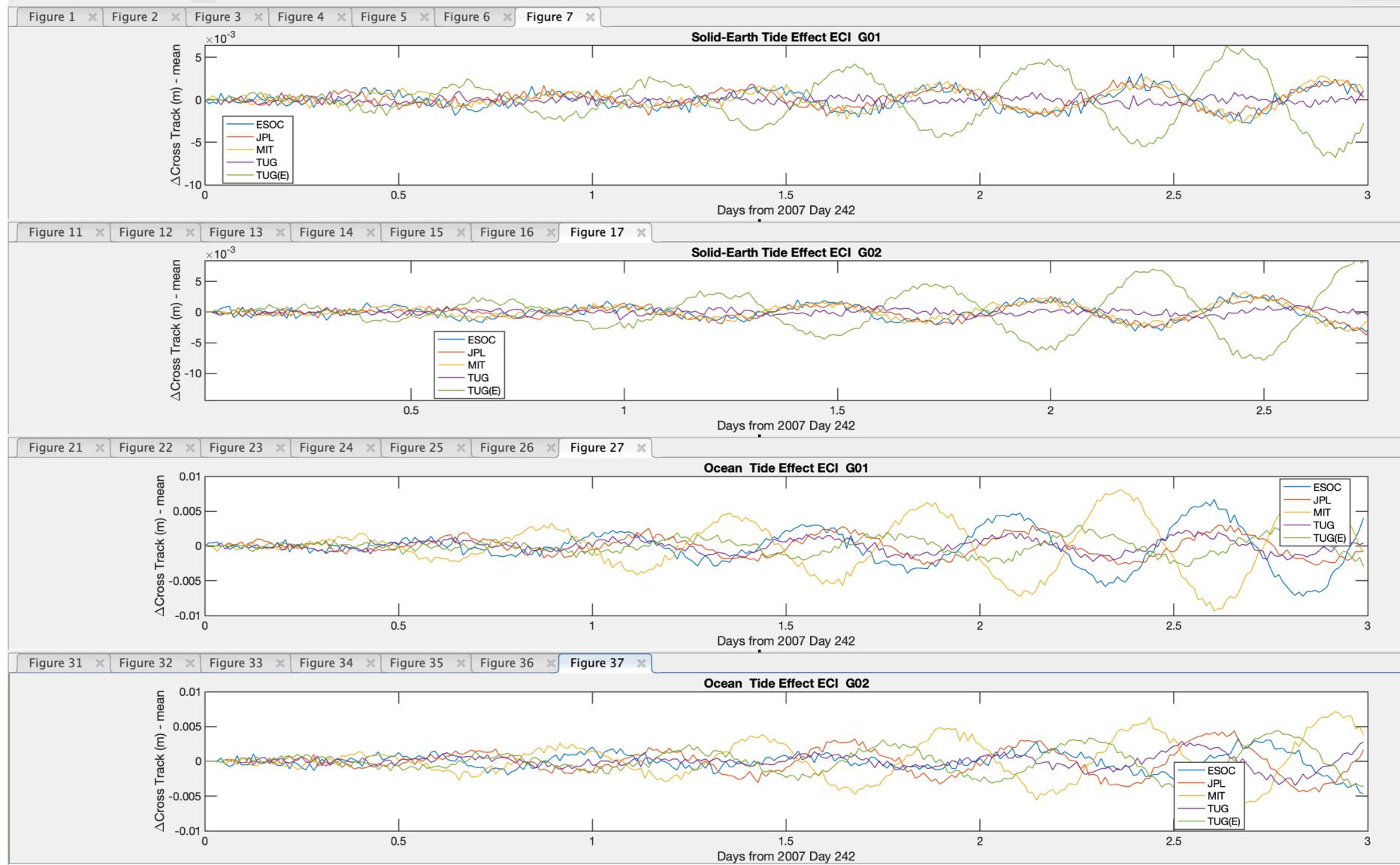
Along track – trend removed



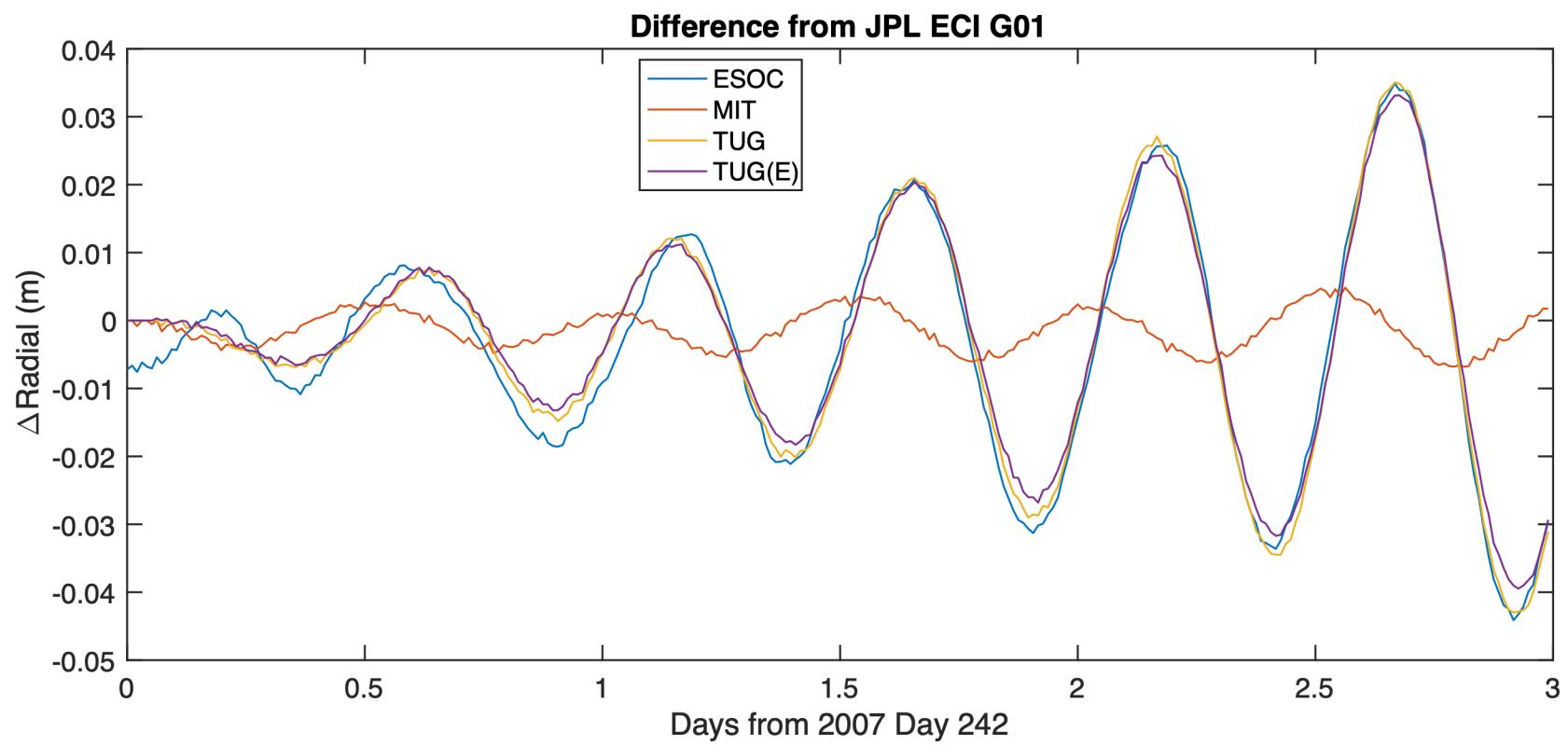
Cross track



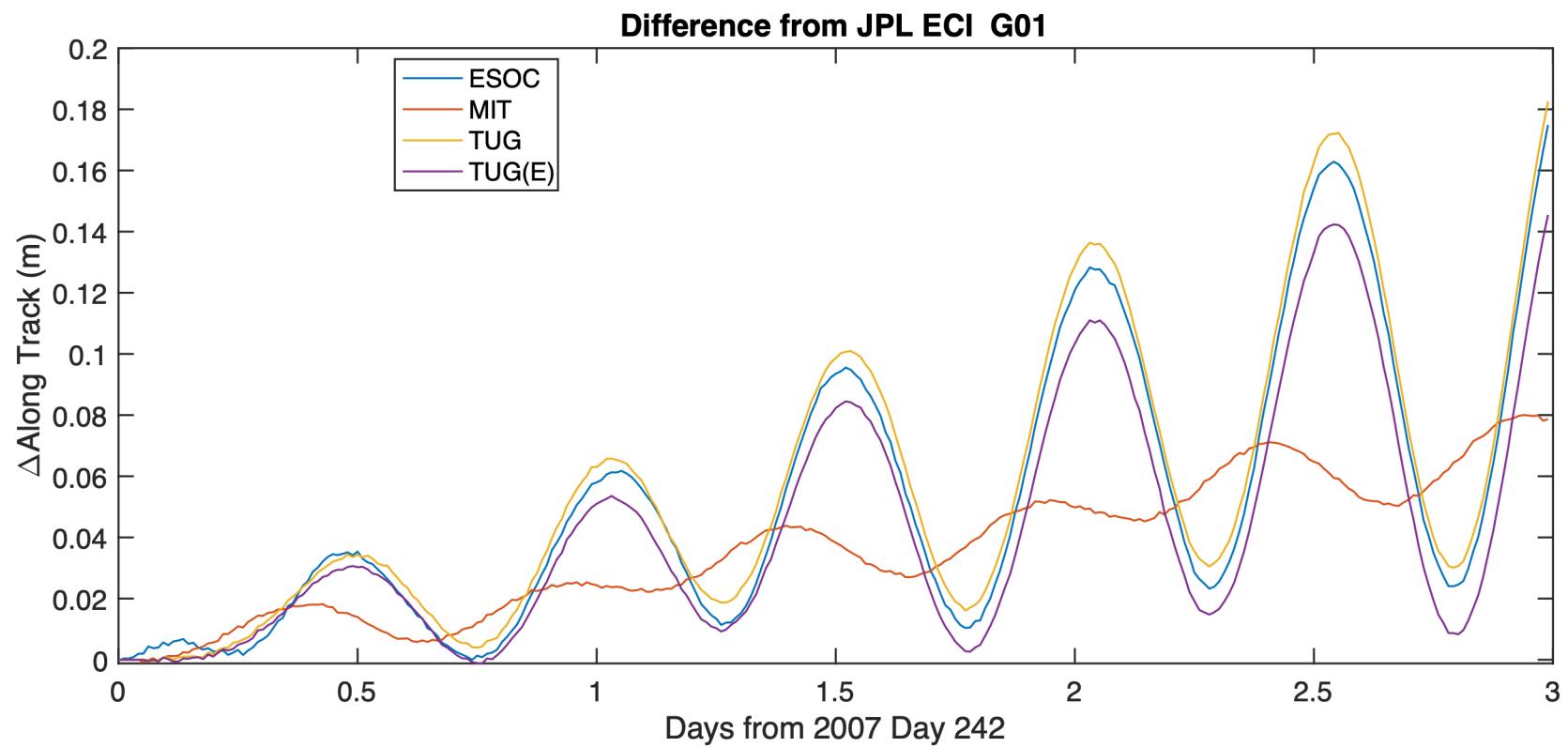
Cross track Residual



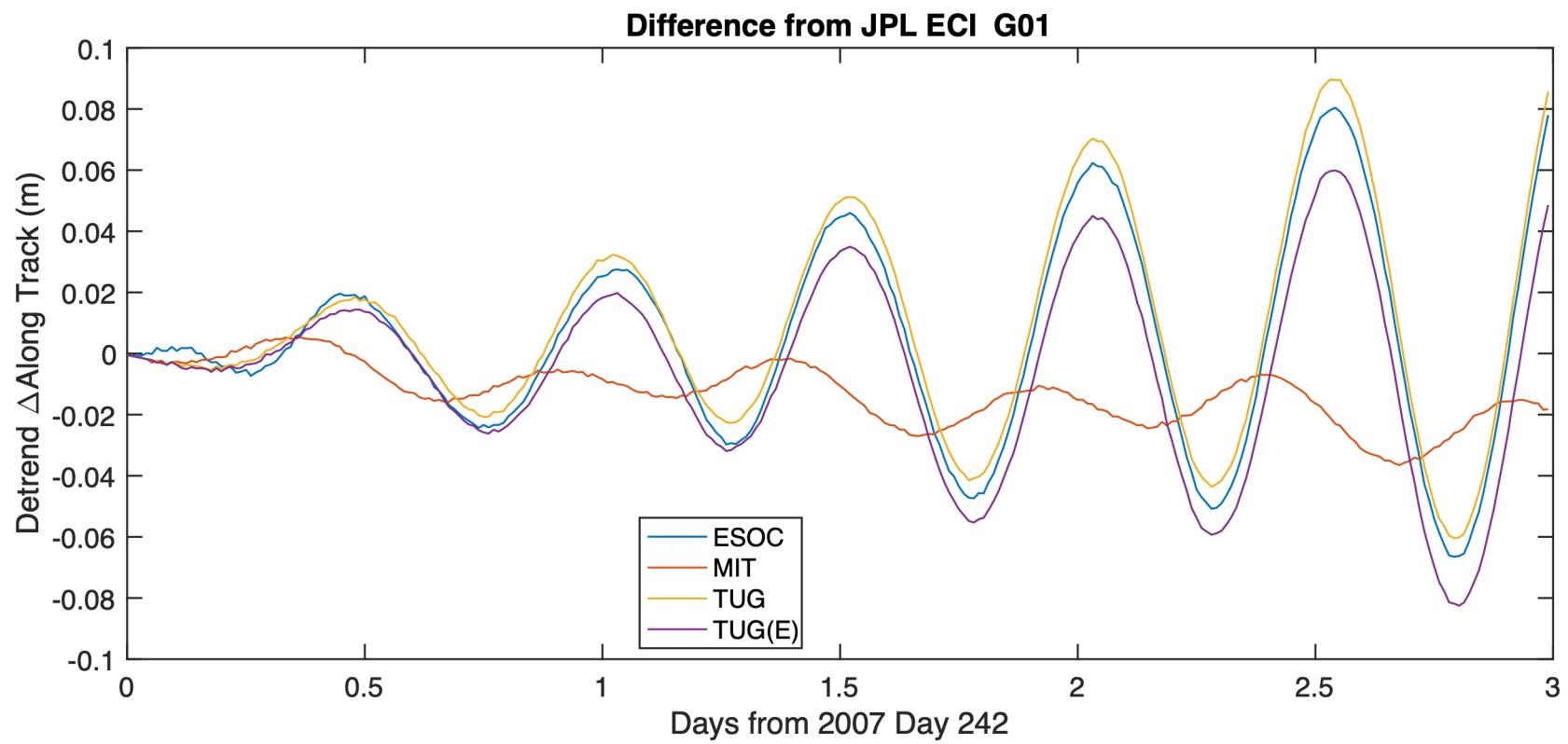
Differences from JPL not tides: Radial



Differences from JPL: Along track



Difference from JPL: Cross track



RMS differences to JPL for No-tides case (G01)

- Center Radial Along Cross (m)
- ESOC 0.017 0.045 0.004
- MIT 0.003 0.022 0.001
- TUG 0.017 0.047 0.003
- TUG(E) 0.016 0.039 0.008
- Comparison with ESOC
- TUG-ESOC 0.003 0.007 0.005