TPXO West Coast vs. measured transports at Mendocino Ridge

- Ship-based measurements of transport through channel in Mendocino Ridge compare well to TPXO during some phases of the tide
- Observation site has bathymetric features at small scales (~5km)
- K1 tidal component is subinertial

Musgrave, MacKinnon, Pinkel & others. Correspondence: rmusgrave@ucsd.edu
Regional tidal model driven by TPXO at boundaries

Internal wave SSH (SSH_IW = SSH - smoothed(SSH))

- K1 component
- M2 component
- Total field

Isopycnal displacement at 500m

- K1 component
- M2 component
- Total field

Musgrave, MacKinnon, Pinkel & others. Correspondence: rmusgrave@ucsd.edu
Regional tidal model driven by TPXO: Power spectra SSH

Wavenumber spectrum from SSH_IW field

Frequency spectrum

- **Wavenumber**: dominated by largest scales, but energy is present down to km scale

- **Frequency**: energy predominantly at D1/D2, but also at harmonics

*Large scale barotropic tide generates SSH features at small scales (~km) and high frequency (<1hr)*
TPXO West Coast vs. regional model transports at Mendocino Ridge

• Regional model produces much more similar tidal transports than TPXO. The differences are:
  • Bathymetric resolution at 1/120° vs. 1/30°
  • Stratified vs. unstratified

• Relative phase of baroclinic trapped subinertial waves strongly influences tidal transport over small scales in this region: dramatic lee waves and turbulence are determined by these small scale features

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