Sea Surface Salinity Seasonal Variability in the Tropics from Satellite, Gridded in situ Products and Mooring Observations

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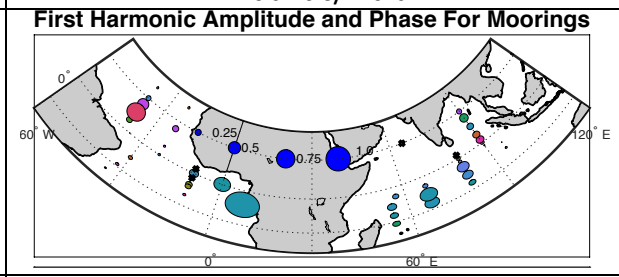
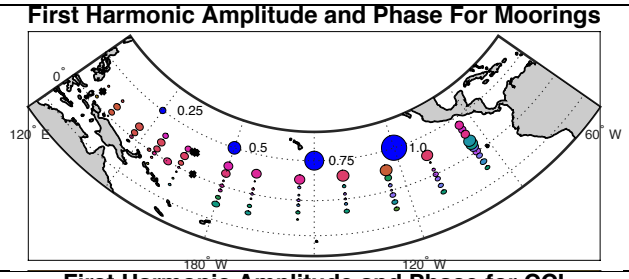
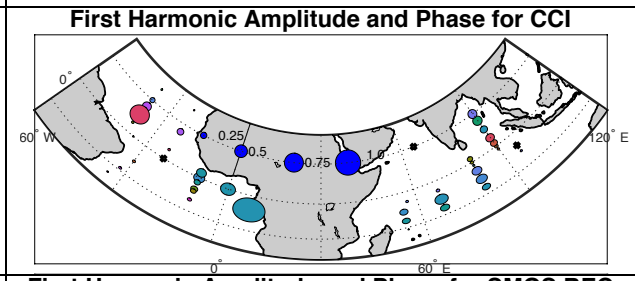
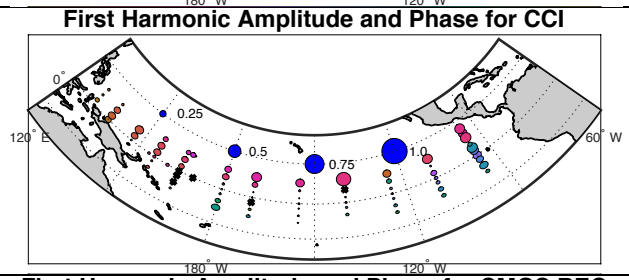
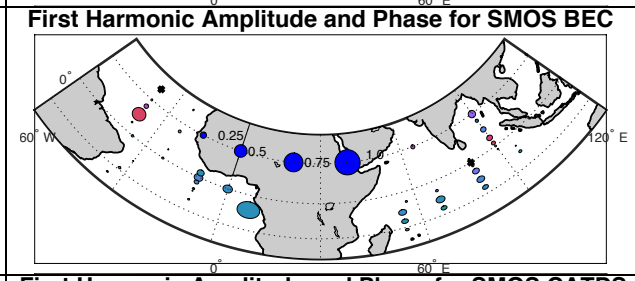
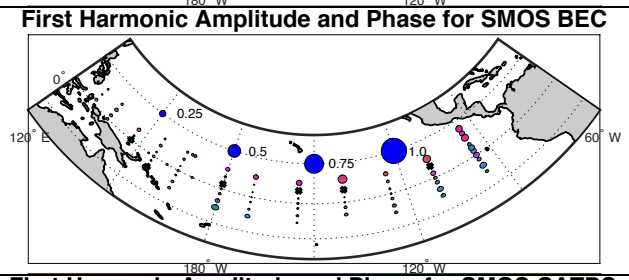
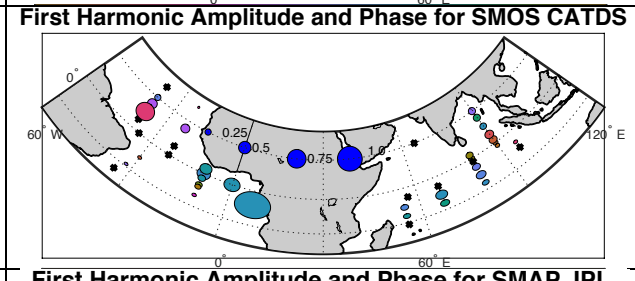
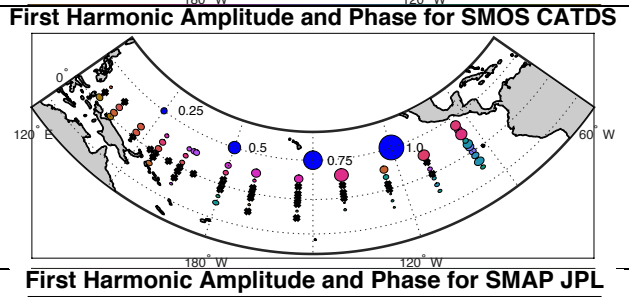
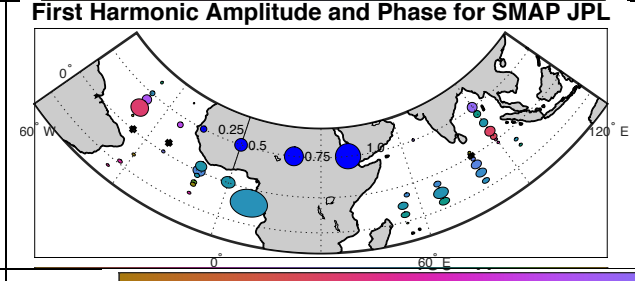
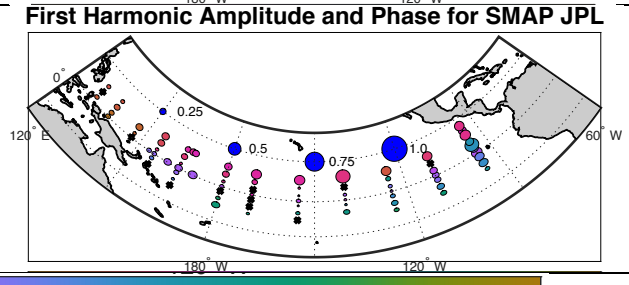
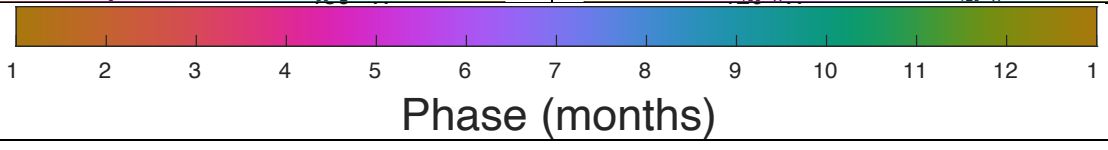
Supplementary material

In this document we include the entire set of maps of amplitude and phase and R^2 for both the annual (Tables S1 and S2) and semi-annual (Table S4 and S5) harmonics. Some of this information is repeated from Figures 3-6. We display amplitudes comparisons for all products (Table S3). Some of this information is repeated from Figure 9. Finally, we quantify the number of significant fits at mooring sites for each dataset (Table S6).

Table S1. Amplitude and phase maps for the ***annual*** harmonic of all products. Left (right) column is Atlantic and Indian (Pacific) basins. Phase color scale in months is at bottom. Different rows are for different products. See Figure 3 for a more complete description.

Product	Atlantic/Indian	Pacific
TMBA		
CCI		
SMOS BEC		
SMOS CATDS		
SMAP JPL		
		

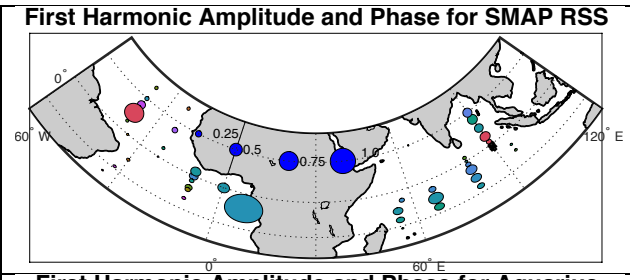
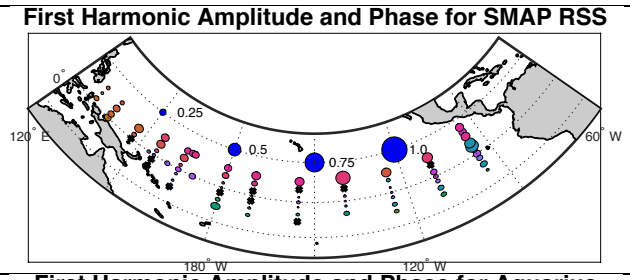
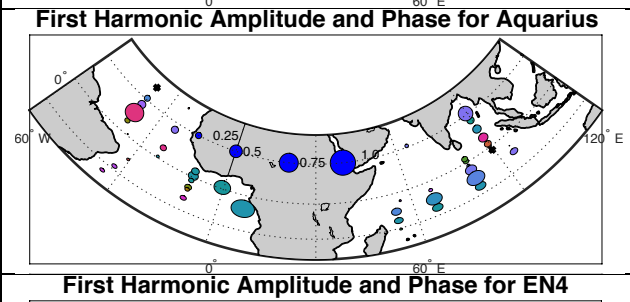
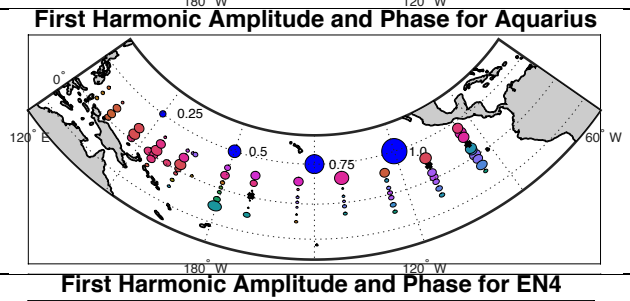
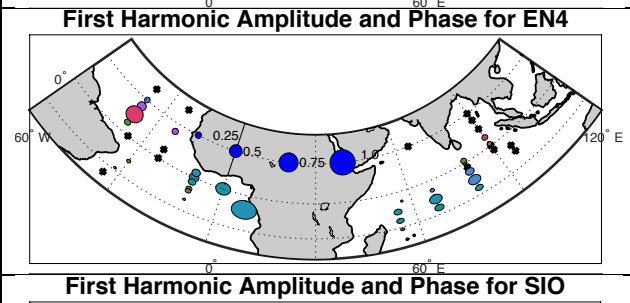
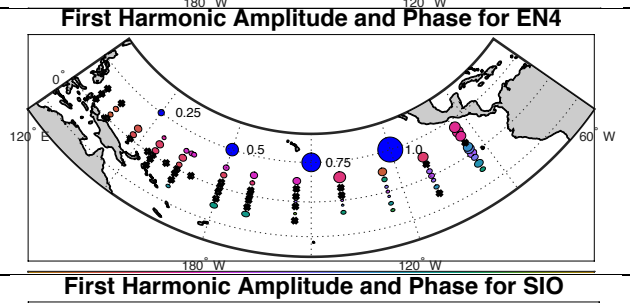
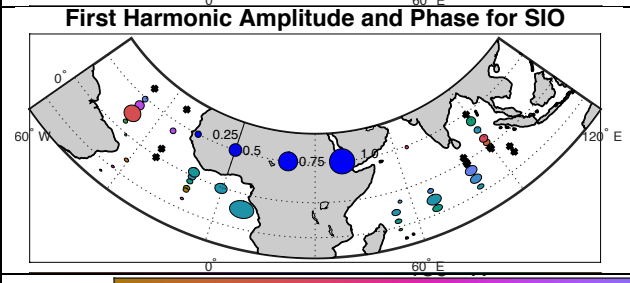
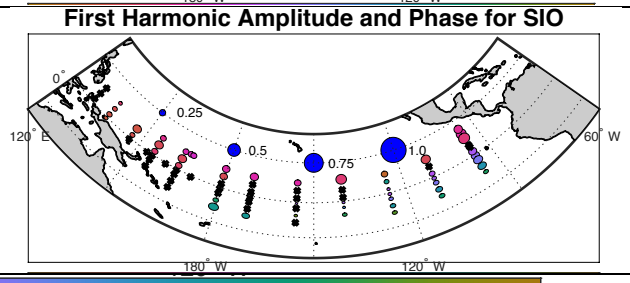
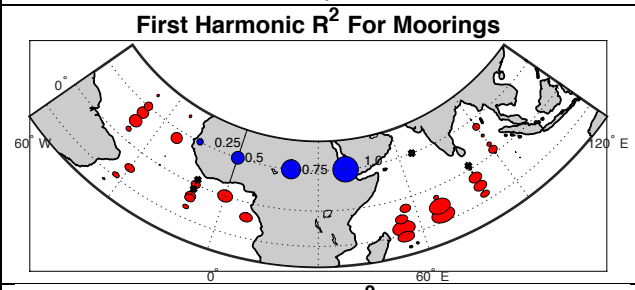
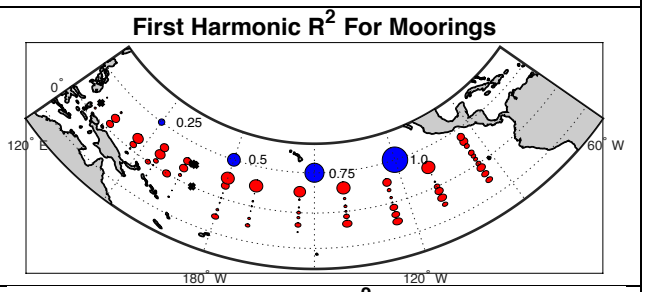
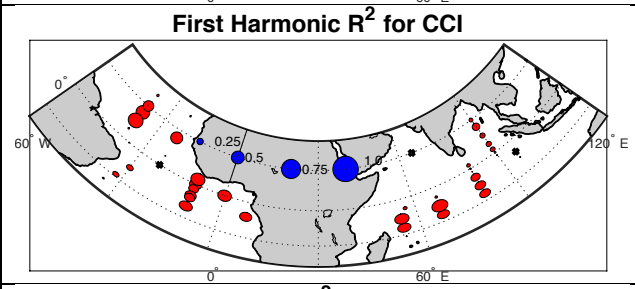
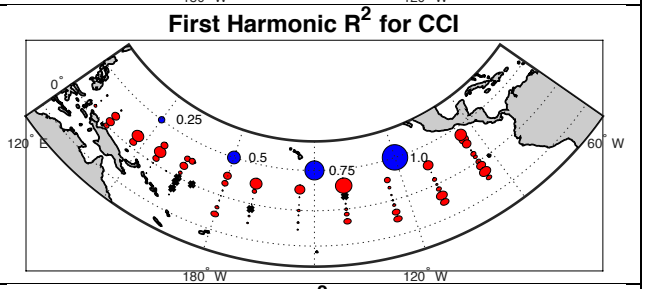
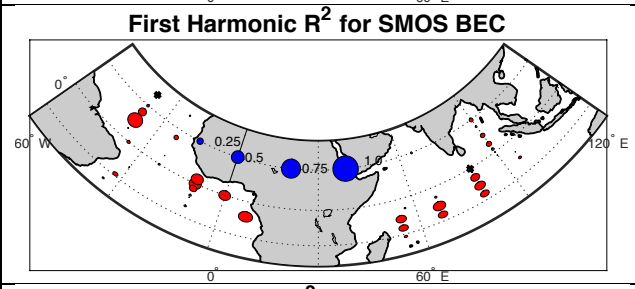
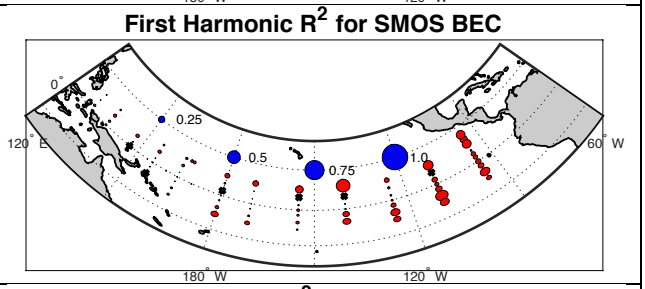
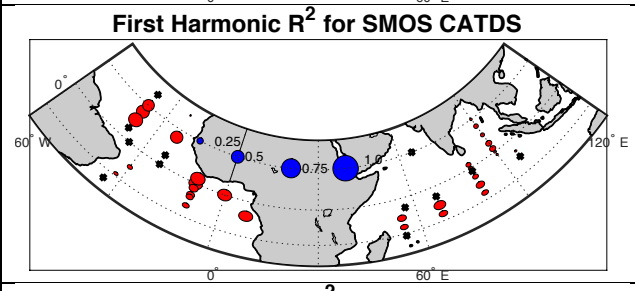
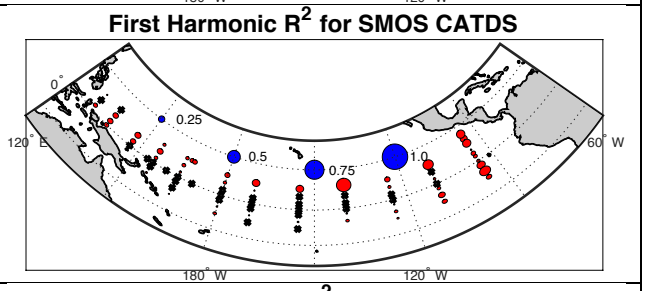
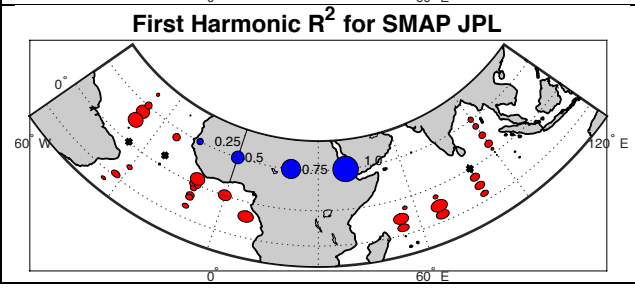
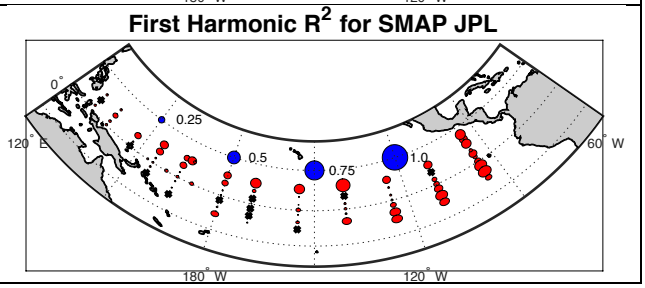
SMAP RSS		
Aquarius		
EN4		
SIO		

Table S2. R^2 maps for the ***annual*** harmonic of all products. Left (right) column is Atlantic and Indian (Pacific) basins. Different rows are for different products. See Figure 4 for a more complete description.

Product	Atlantic/Indian	Pacific
TMBA		
CCI		
SMOS BEC		
SMOS CATDS		
SMAP JPL		

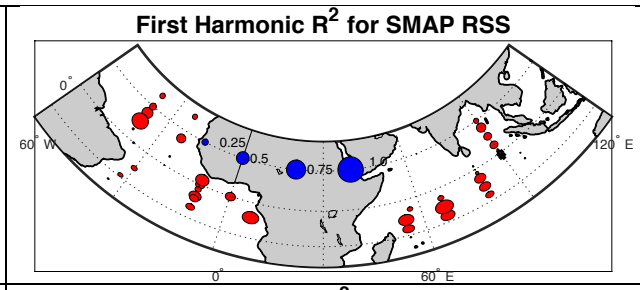
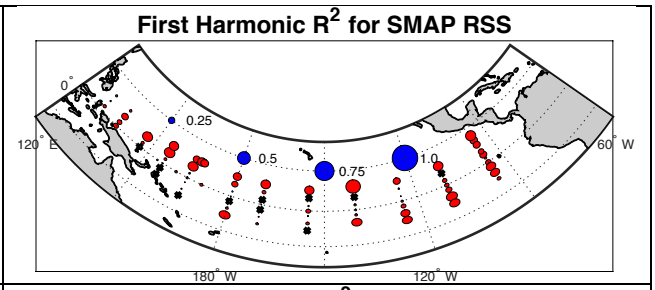
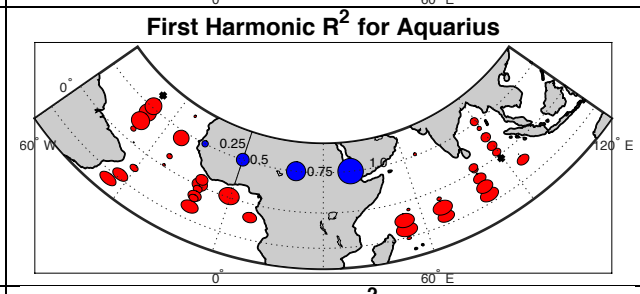
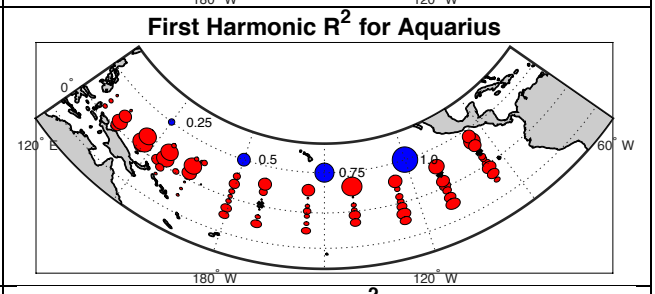
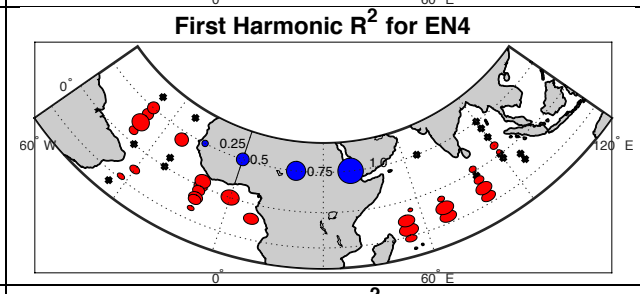
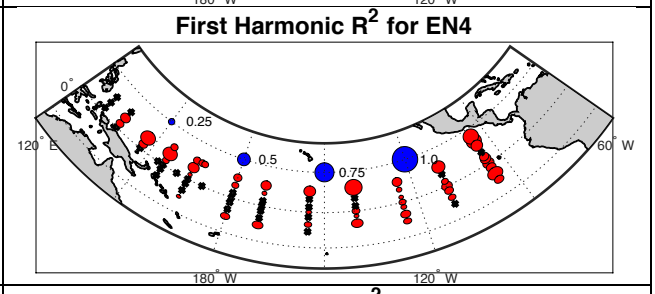
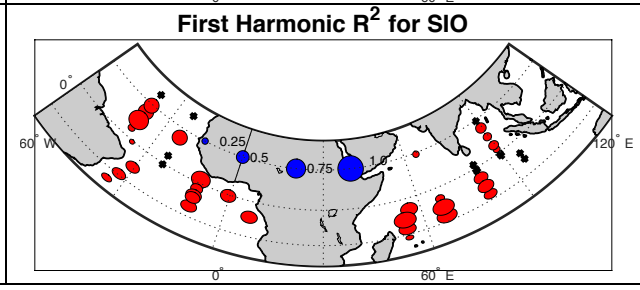
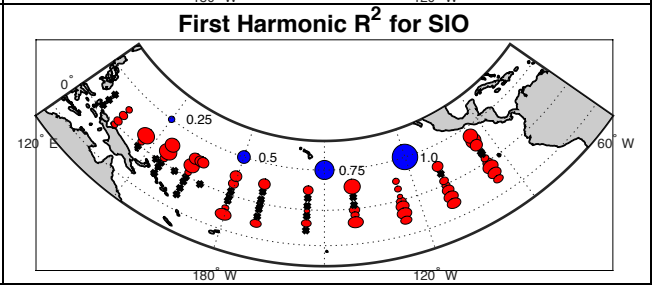
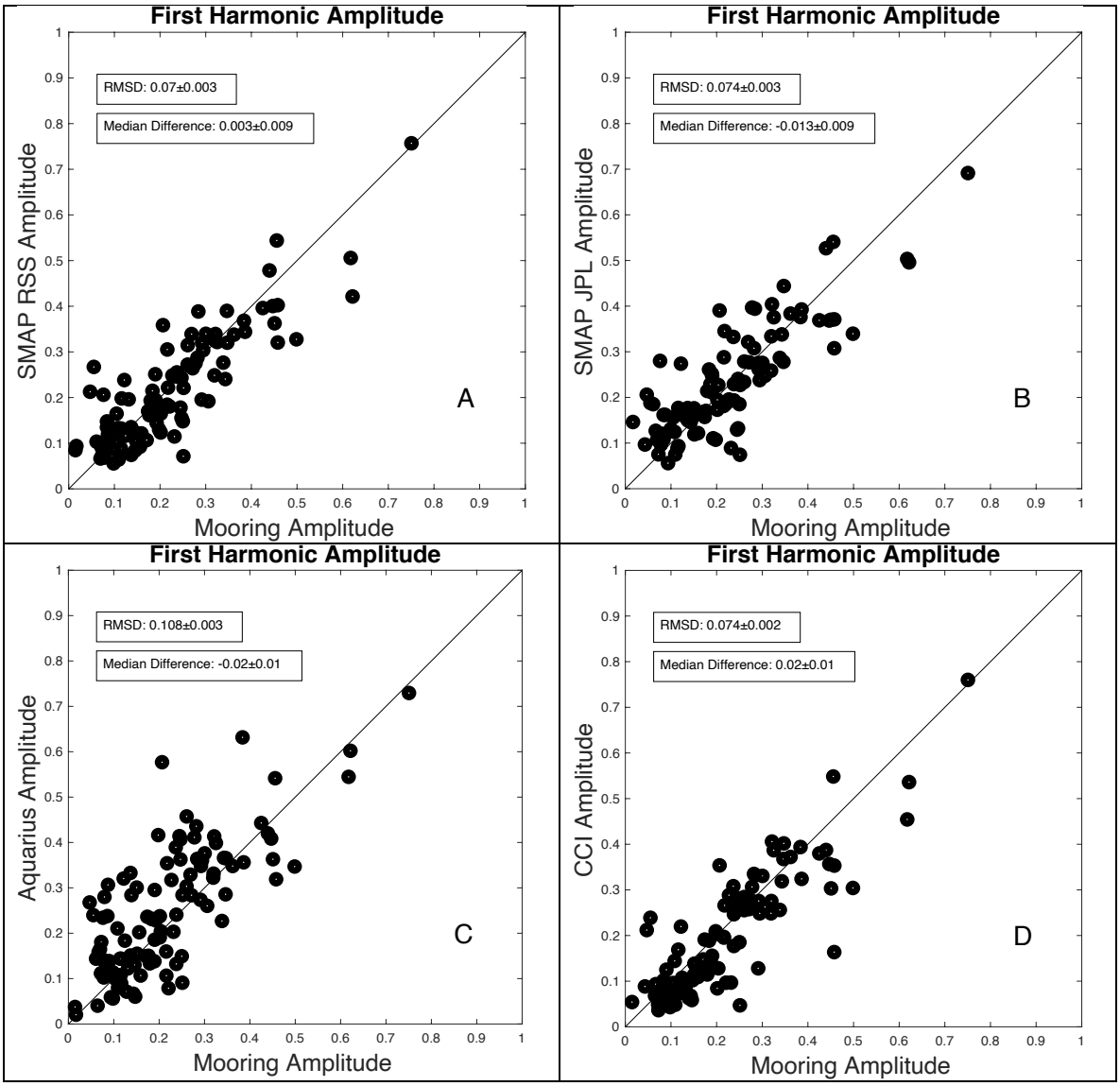
SMAP RSS		
Aquarius		
EN4		
SIO		

Table S3. Scatterplots of **annual** harmonic amplitude vs. mooring amplitude. A light black line shows a one-to-one correspondence. Boxes in each panel show RMSD and median difference (mooring - comparison). Comparison amplitudes are: a) SMAP RSS, b) SMAP JPL, c) Aquarius, d) CCI, e) SMOS CATDS, f) SMOS BEC, g) EN4, h) SIO.



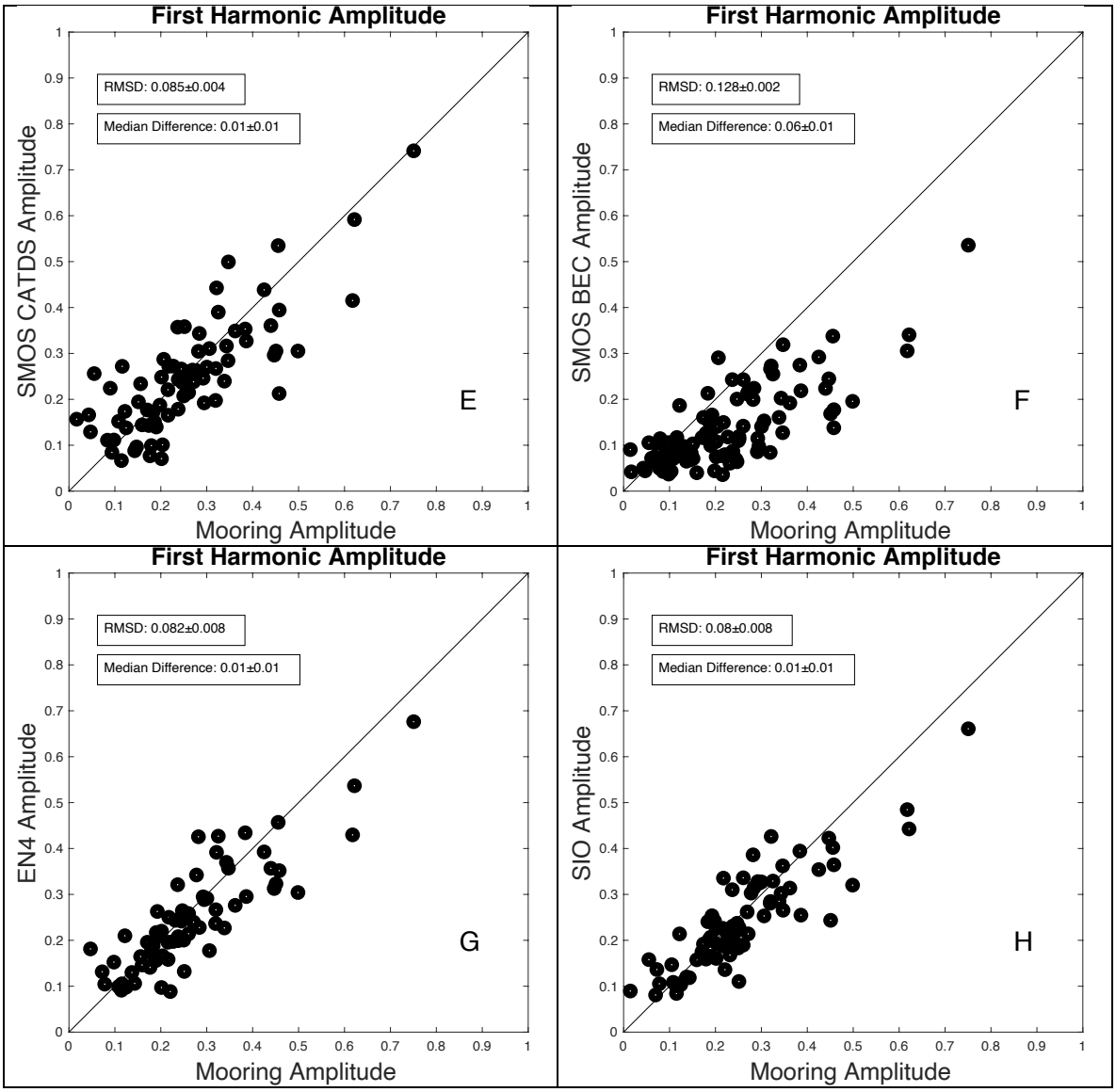
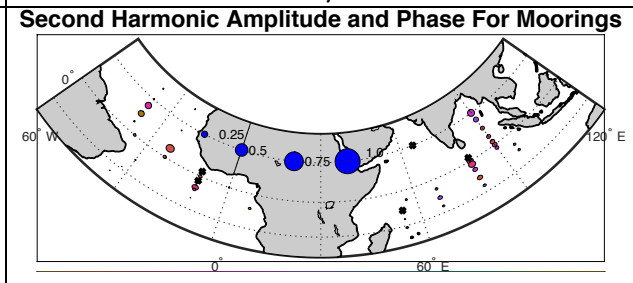
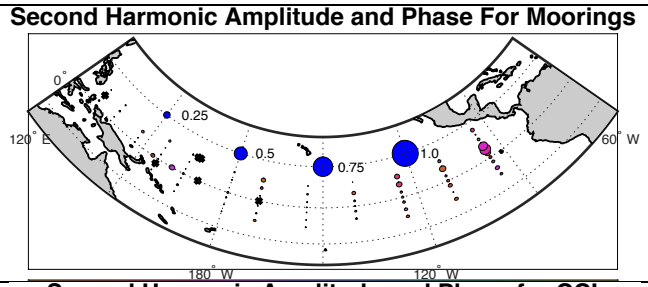
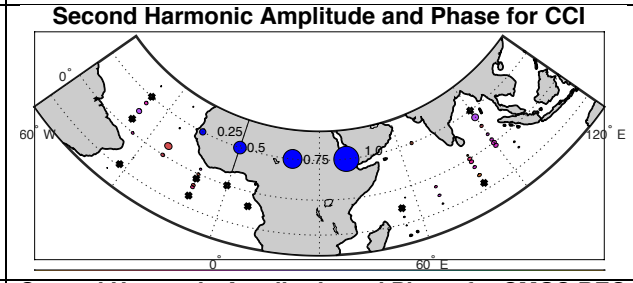
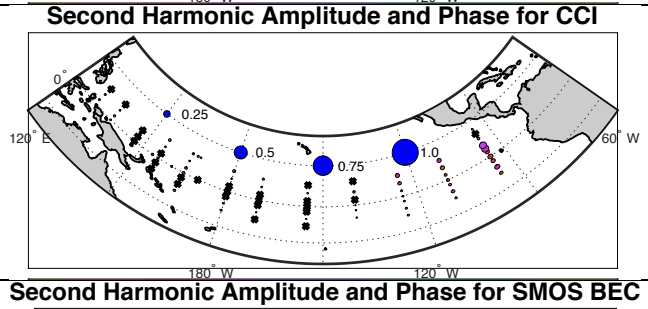
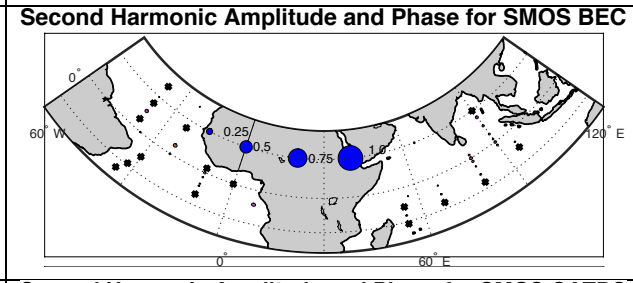
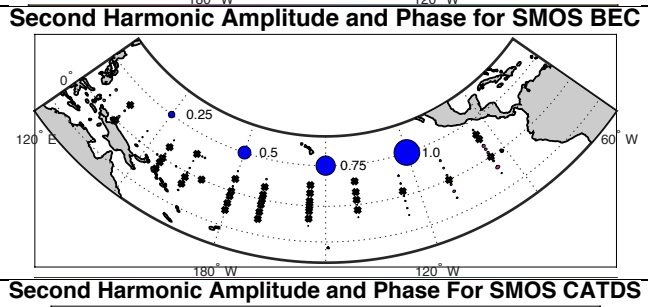
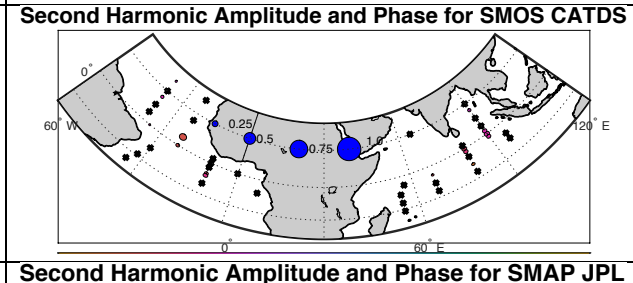
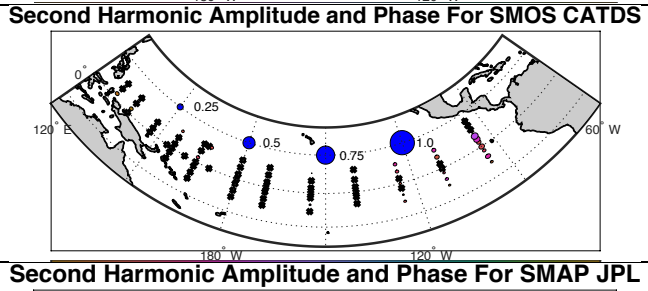
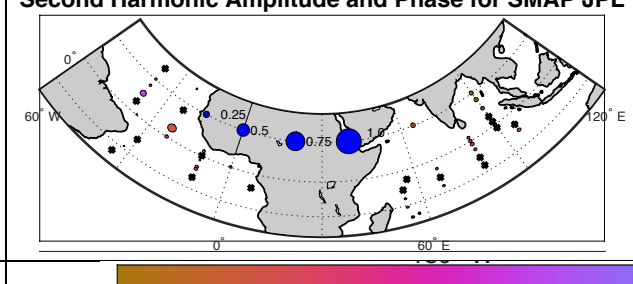
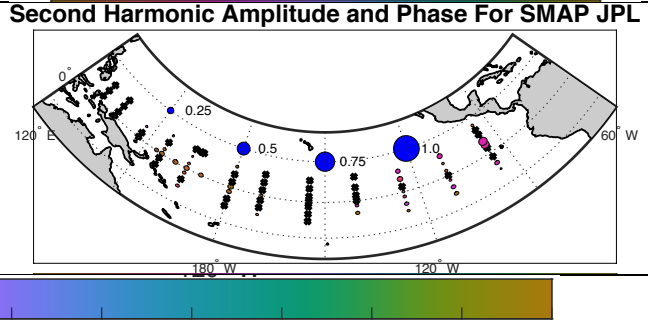
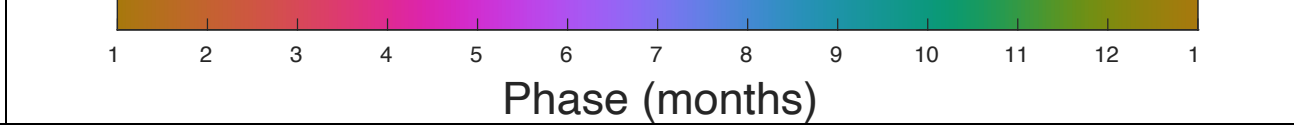
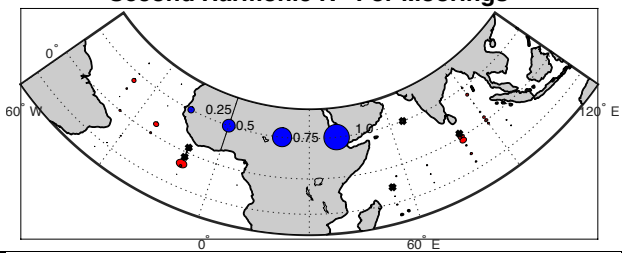
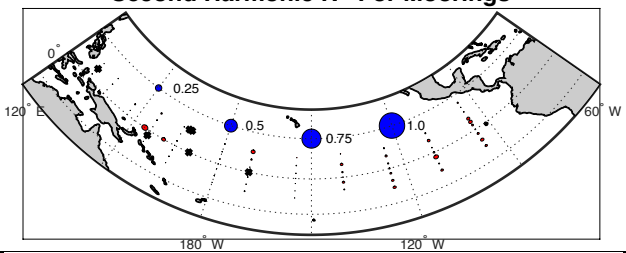
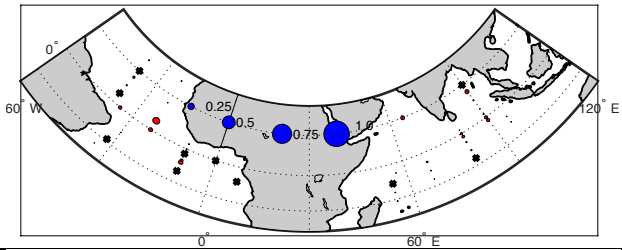
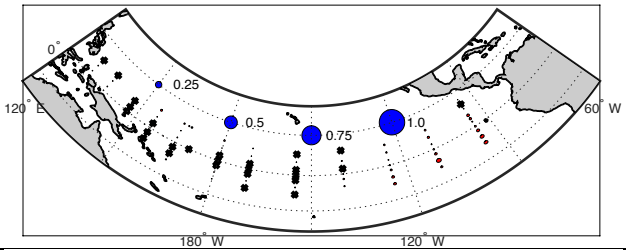
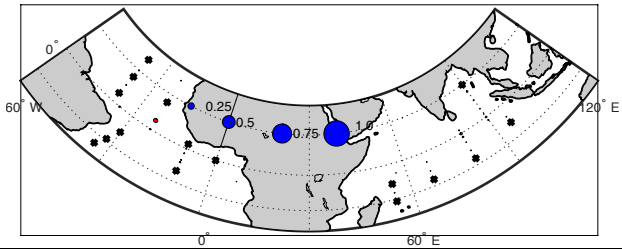
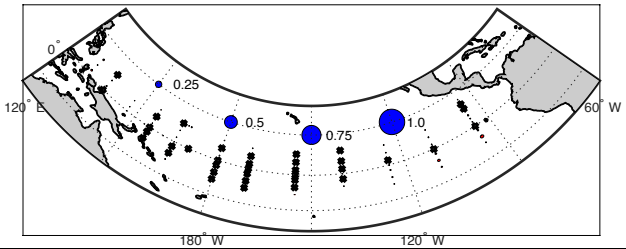
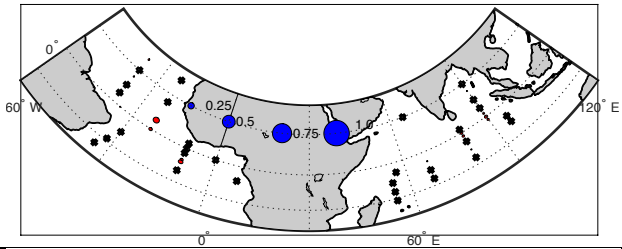
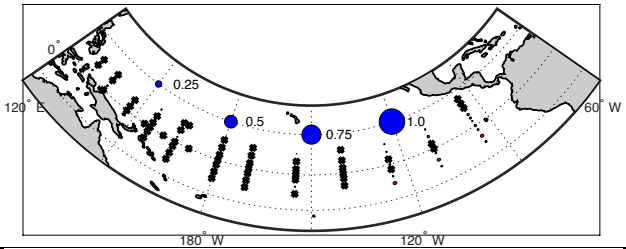
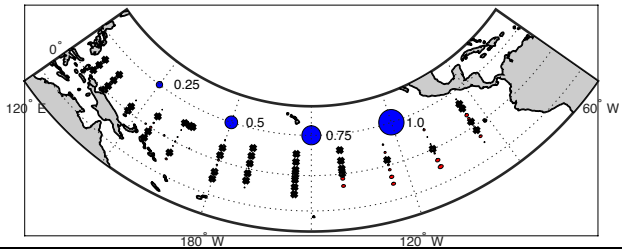
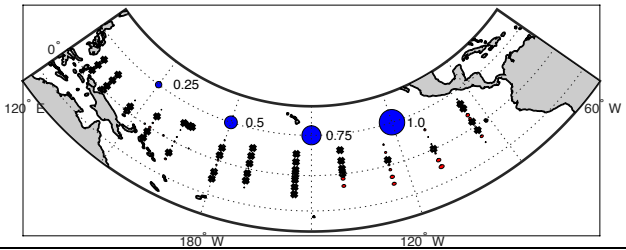

First Harmonic Amplitude
RMSD: 0.085±0.004
Median Difference: 0.01±0.01
SMOS CATDS Amplitude
Mooring Amplitude
E
First Harmonic Amplitude
RMSD: 0.128±0.002
Median Difference: 0.06±0.01
SMOS BEC Amplitude
Mooring Amplitude
F
First Harmonic Amplitude
RMSD: 0.082±0.008
Median Difference: 0.01±0.01
EN4 Amplitude
Mooring Amplitude
G
First Harmonic Amplitude
RMSD: 0.08±0.008
Median Difference: 0.01±0.01
SIO Amplitude
Mooring Amplitude
H

Table S4. Amplitude and phase maps for the ***semi-annual*** harmonic of all products. Left (right) column is Atlantic and Indian (Pacific) basins. Different rows are for different products. See Figure 3 for a more complete description.

Product	Atlantic/Indian	Pacific
TMBA		
CCI		
SMOS BEC		
SMOS CATDS		
SMAP JPL		
		

SMAP RSS	Second Harmonic Amplitude and Phase for SMAP RSS	Second Harmonic Amplitude and Phase for SMAP RSS
Aquarius	Second Harmonic Amplitude and Phase for Aquarius	Second Harmonic Amplitude and Phase For Aquarius
EN4	Second Harmonic Amplitude and Phase for EN4	Second Harmonic Amplitude and Phase for EN4
SIO	Second Harmonic Amplitude and Phase for SIO	Second Harmonic Amplitude and Phase for SIO

Table S5. R^2 maps for the ***semi-annual*** harmonic of all products. Left (right) column is Atlantic and Indian (Pacific) basins. Different rows are for different products. See Figure 4 for a more complete description.

Product	Atlantic/Indian	Pacific
TMBA		
CCI		
SMOS BEC		
SMOS CATDS		
SMAP JPL		

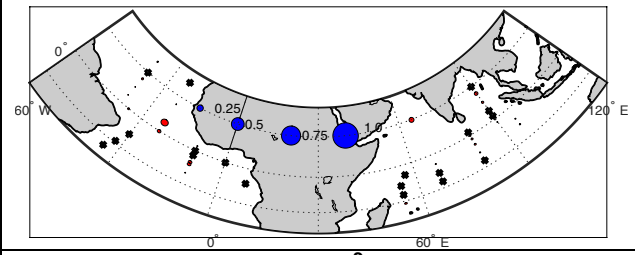
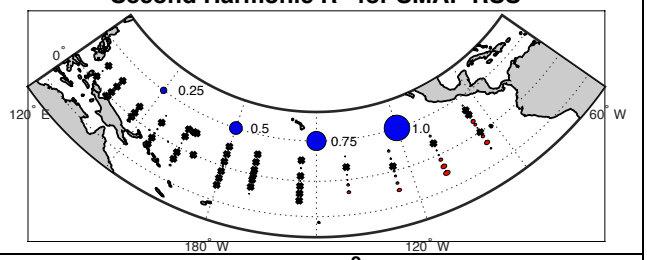
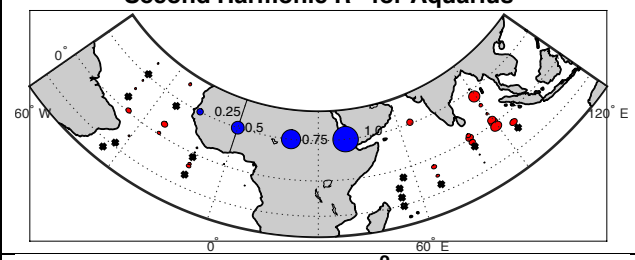
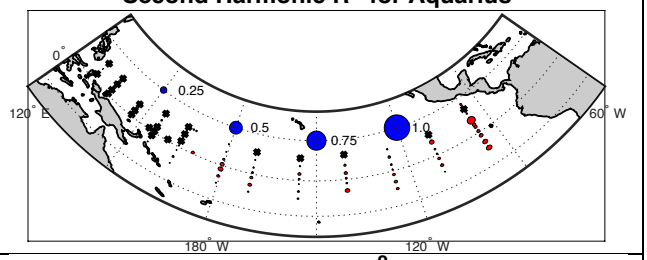
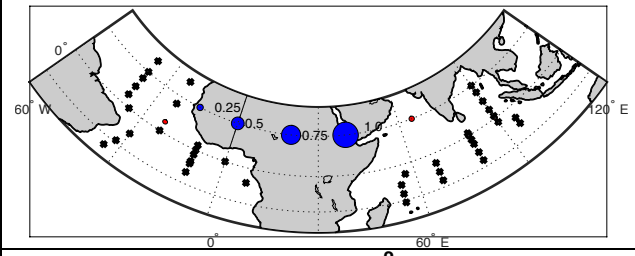
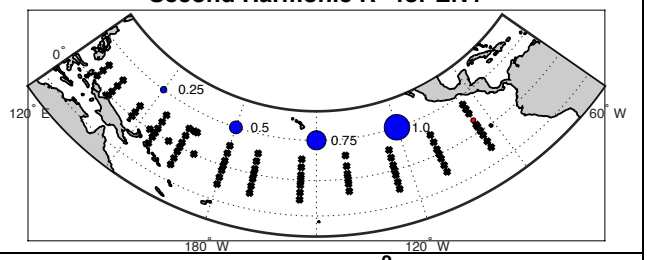
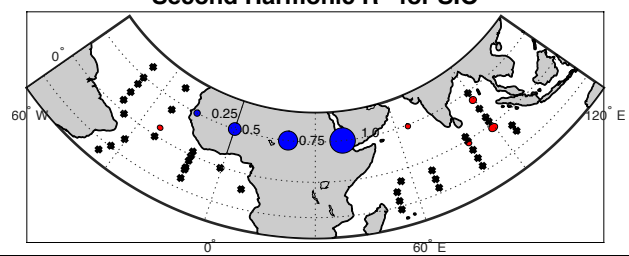
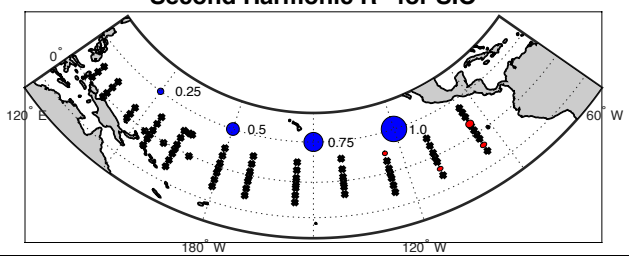
SMAP RSS		
Aquarius		
EN4		
SIO		

Table S6. Numbers of annual and semiannual harmonic fits to 95% statistical significance. There are 123 total locations so that is the maximum for any of these categories. The significance calculation depends largely on the number of data points, so some semiannual mooring fits were determined to be significant in spite of very small amplitudes, since the data was hourly and over many years.

Dataset	Number of significant annual fits	Number of significant semiannual fits
Moorings	115	112
SMOS BEC	115	71
SMOS CATDS	81	39
CCI	113	86
SMAP JPL	109	64
SMAP RSS (70 km)	110	62
Aquarius	118	86
EN4	76	4
SIO	80	10