Aquarius and SMOS SSS Measurements: A Review of Initial Results

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http://www.esa.int/Our_Activities/Observing_the_Earth/The_Living_Planet_Programme/Earth_Explorers/SMOS/ESA_s_water_mission_SMOS

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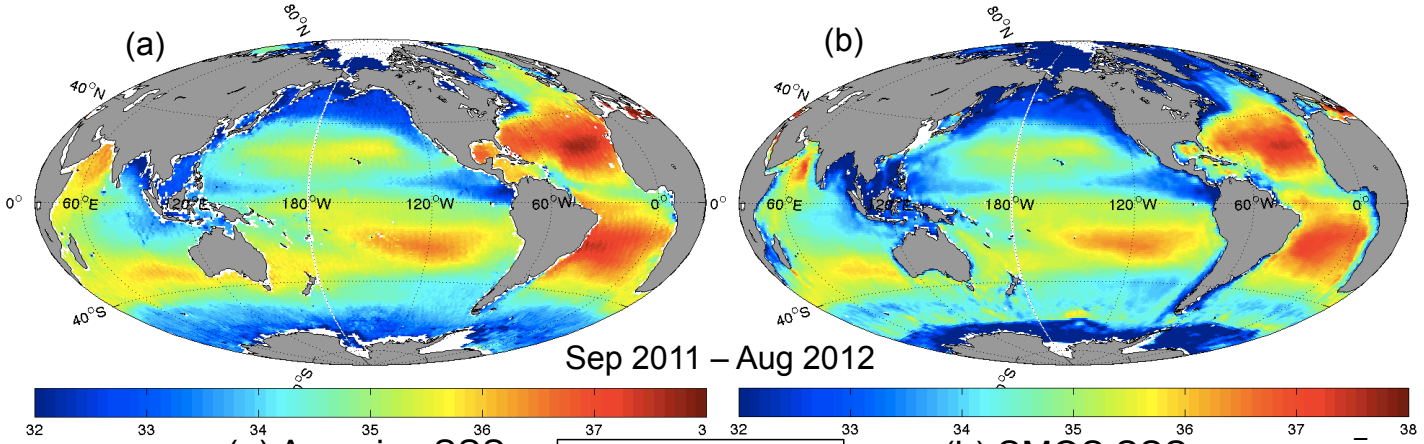
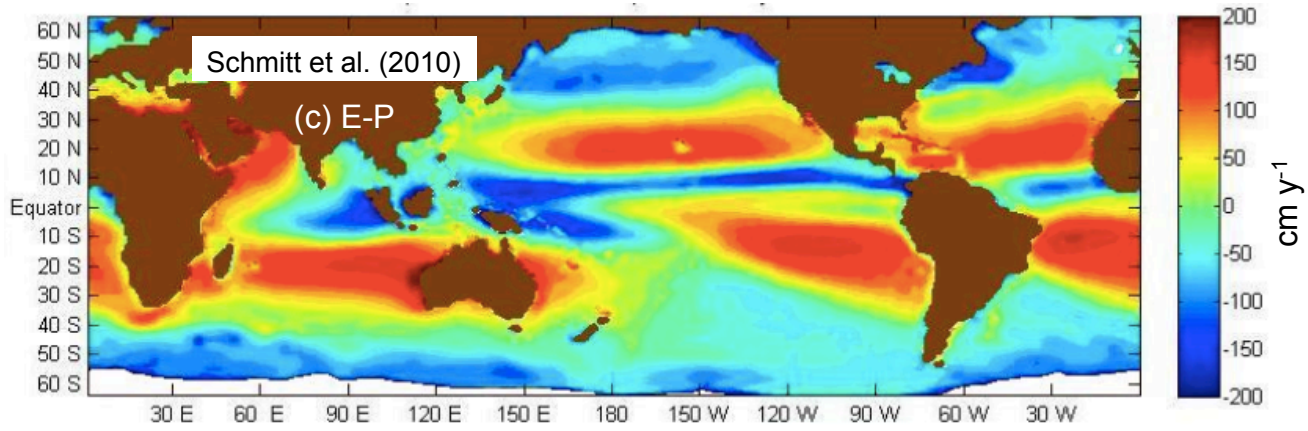
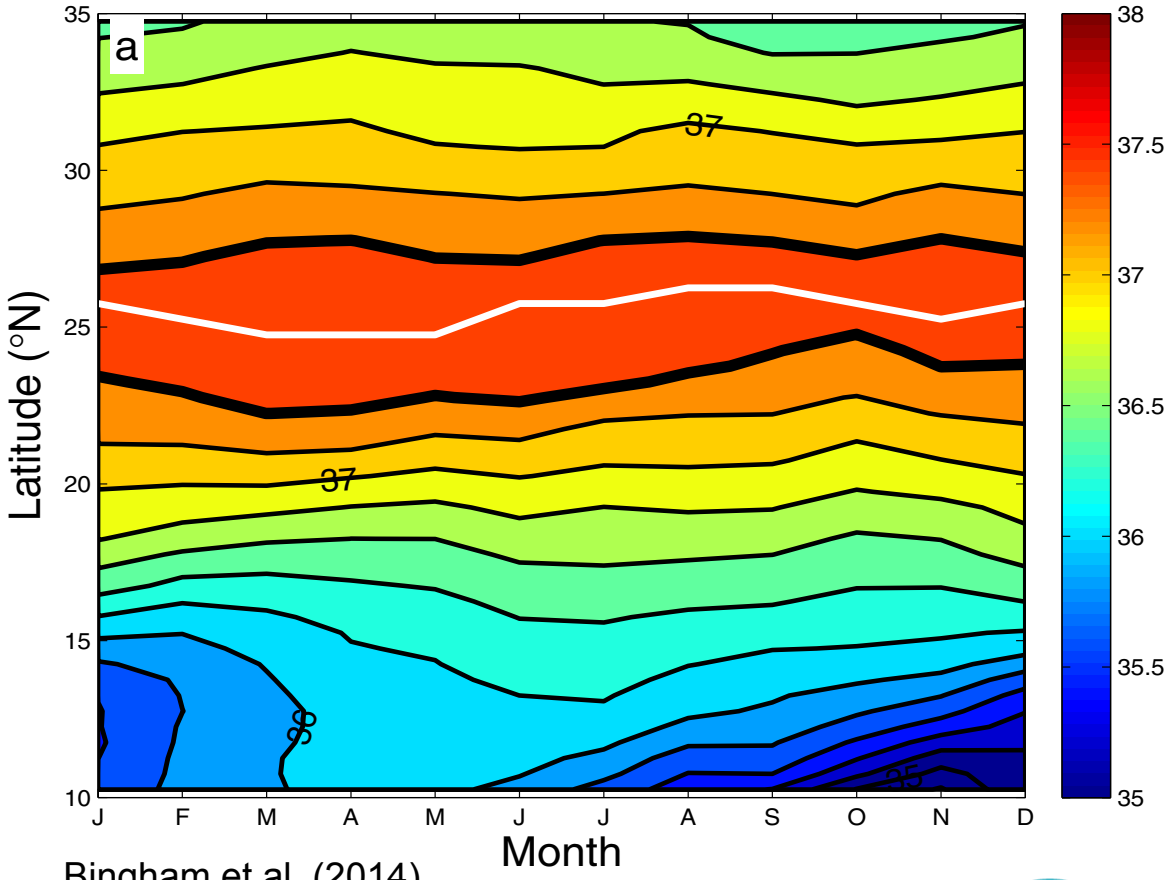
Aquarius and SMOS SSS and Evaporation Minus Precipitation Climatology



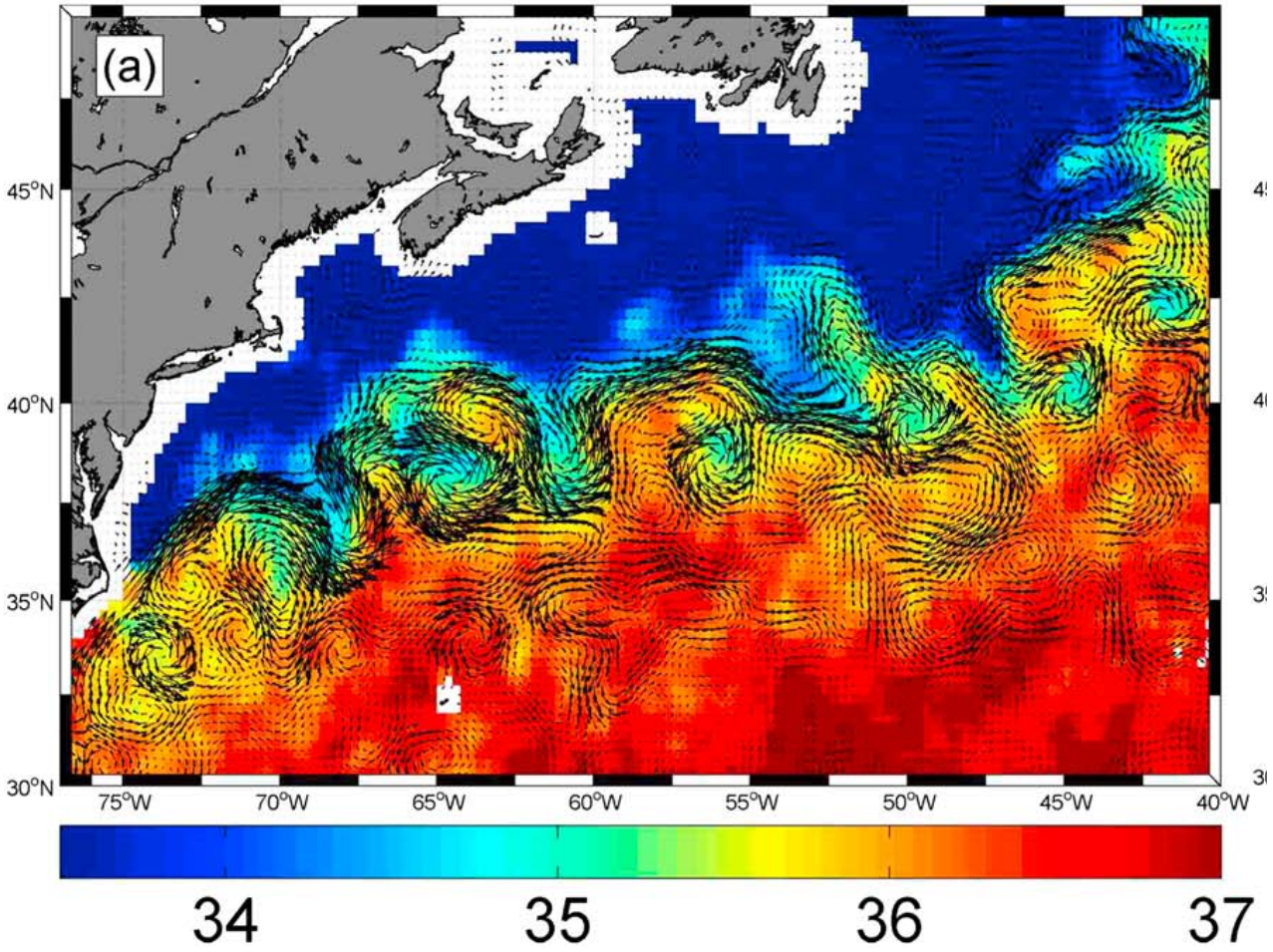


Monthly Averaged Aquarius SSS
10 – 35 °N, 45 – 30 °W; Aug 2011 – Sep 2013



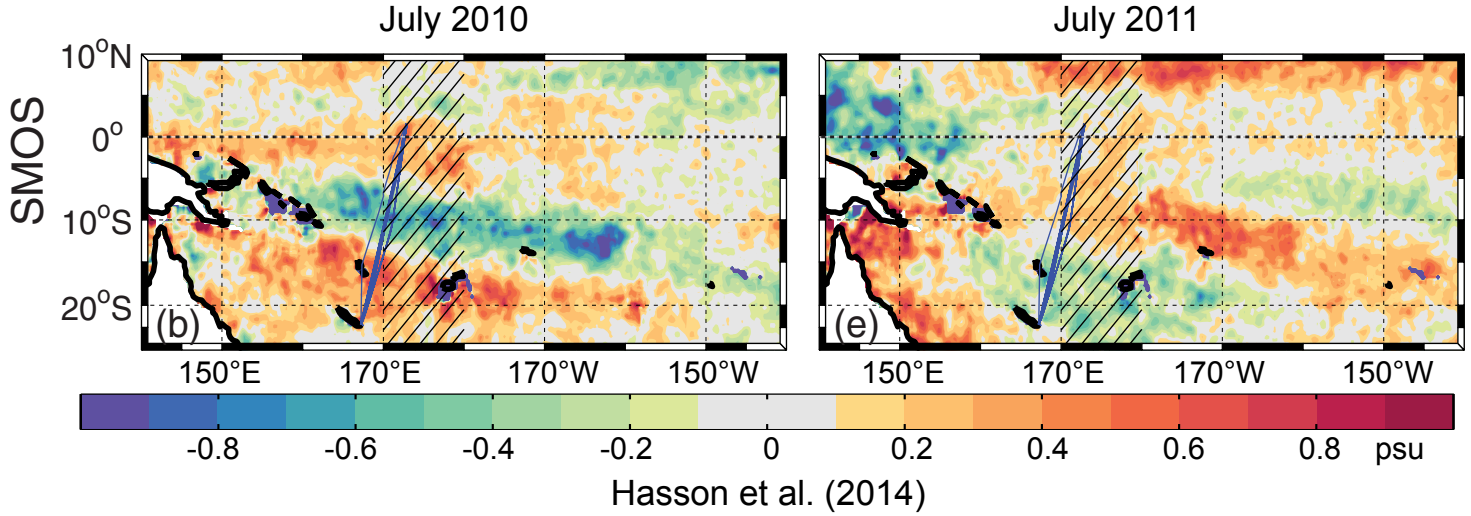
Bingham et al. (2014)

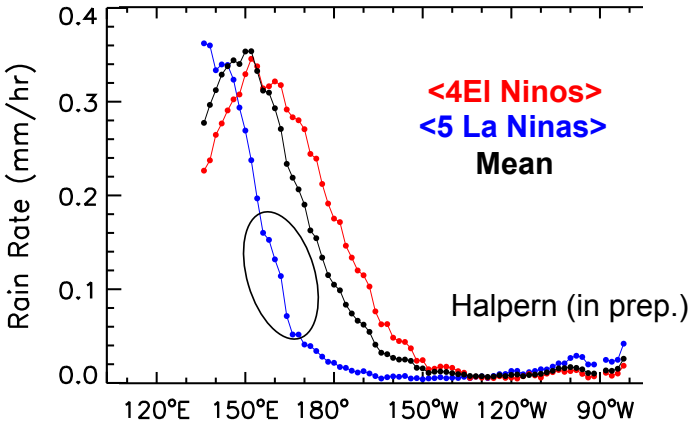
SMOS SSS Measures Gulf Stream Meanders



Reul et al. (2014)

SSS and La Niña





Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2000	-1.7	-1.5	-1.2	-0.9	-0.8	-0.7	-0.6	-0.5	-0.6	-0.6	-0.8	-0.8
2001	-0.7	-0.6	-0.5	-0.4	-0.2	-0.1	0.0	0.0	-0.1	-0.2	-0.3	-0.3
2002	-0.2	0.0	0.1	0.3	0.5	0.7	0.8	0.8	0.9	1.2	1.3	1.3
2003	1.1	0.8	0.4	0.0	-0.2	-0.1	0.2	0.4	0.4	0.4	0.4	0.3
2004	0.3	0.2	0.1	0.1	0.2	0.3	0.5	0.7	0.8	0.7	0.7	0.7
2005	0.6	0.4	0.3	0.3	0.3	0.3	0.2	0.1	0.0	-0.2	-0.5	-0.8
2006	-0.9	-0.7	-0.5	-0.3	0.0	0.1	0.2	0.3	0.5	0.8	1.0	1.0
2007	0.7	0.3	-0.1	-0.2	-0.3	-0.3	-0.4	-0.6	-0.8	-1.1	-1.2	-1.4
2008	-1.5	-1.5	-1.2	-0.9	-0.7	-0.5	-0.3	-0.2	-0.1	-0.2	-0.5	-0.7
2009	-0.8	-0.7	-0.5	-0.2	0.2	0.4	0.5	0.6	0.8	1.1	1.4	1.6
2010	1.6	1.3	1.0	0.6	0.1	-0.4	-0.9	-1.2	-1.4	-1.5	-1.5	-1.5
2011	-1.4	-1.2	-0.9	-0.6	-0.3	-0.2	-0.2	-0.4	-0.6	-0.8	-1.0	-1.0
2012	-0.9	-0.6	-0.5	-0.3	-0.2	0.0	0.1	0.4	0.5	0.6	0.2	-0.3
2013	-0.6	-0.6	-0.4	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.2	-0.3	-0.4
2014	-0.6	-0.6	-0.5	-0.1	0.1	0.1	0.0	0.0	0.2	0.5	0.7	0.7
2015	0.6	0.5										

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Aquarius and SMOS SSS Measurements

- Summary
  - salt budget in the North Atlantic
  - tropical instability waves
  - Rossby waves
  - mesoscale motions
  - freshening of surface coastal waters from riverine outflow and impact on hurricane forecasting in northwest Atlantic
  - SSS response to La Niña

- Recommendations
  - Support sustained high spatial and high frequency SSS measurements for improved weather and climate applications.
  - Assimilate measurements of satellite SSS, sea surface temperature, and ocean surface topography, together with in-situ measurement, into ocean general circulation models to improve estimates of vertical profiles of ocean currents and ocean heat transport

CGMS Guidance to IOC-UNESCO for CGMS-44

- IOC Global Ocean Observing System (GOOS) Ocean Observations Panel for Climate (OOPC) defined the Essential Ocean Variables (EOVs):
  - Sea surface temperature, CGMS-39
  - Ocean surface vector wind [meteorological ECV], CGMS-40
  - Ocean surface topography, CGMS-41
  - Ocean color, CGMS-42
  - Sea surface salinity, CGMS-43
  - **Sea ice, CGMS-44**
  - Sea state
  - Current
  - Carbon dioxide partial pressure
- IOC, with support of JCOMM, proposes Sea Ice to be the subject of the CGMS-44 IOC-WP-01.
  - Tentative title would be "Satellite Sea Ice Extent, Motion and Thickness Measurements: Contributions to Weather and Climate Variations."