Salinity remote sensing: decadal view

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OSST 2018 and beyond …

Upcoming opportunities:

ROSES-19: OSST
ROSES-20: Field campaign
ROSES-21: OSST

NASA Earth Venture Continuity mission?
The OceanObs’19 conference is a community-driven conference that brings people from all over the planet together to communicate the decadal progress of ocean observing networks and to chart innovative solutions to society’s growing needs for ocean information in the coming decade.

www.oceanobs19.net
Satellite salinity observing system: recent discoveries and the way forward

Nadya Vinogradova, Tong Lee, Jacqueline Boutin, Kyla Drushka, Severine Fournier, Roberto Sabia, Detlef Stammer, Eric Bayler, Nicolas Reul, Arnold Gordon, Oleg Melnichenko, Laifang Li, Eric Hackert, Matthew Martin, Nicolas Kolodziejczyk, Audrey Hasson, and Eric Lindstrom
1. Scientific drivers for satellite salinity

**Ocean circulation**
TIWs, Rossby waves, Smax, Smin, internal climate variability, MJO, IOD, IPO

**Earth water cycle**
Salinity fingerprints, E-P amplification, land-ocean interaction, floods, rivers

**Mesoscale oceanography**
Synoptic view of mesoscale features, fronts, and eddies; kinetic energy from space

*Lee et al. 2012*

*Hasson et al. 2018 Vinogradova & Ponte 2017*

*Vinogradova & Ponte 2017a*

*Fournier et al. 2016 Melnichenko et al. 2016*

*Hasson et al. 2018 Vinogradova & Ponte 2017*
1. Scientific drivers for satellite salinity

Ocean biogeochemistry
Ocean carbon system, space-based ocean acidification

Climate modeling and ocean state estimates
Synergistic, dynamically-consistent ocean view as an additional components of the salinity observing network

Fine et al. 2017

(a) Vertically-integrated, global-mean salinity over the past two decades
(b) Multi-platform mean sea surface salinity
(c) ECCO misfits with surface salinity data (satellite + in situ)

Vinogradova 2018
2. Application drivers for satellite salinity

**Hurricane monitoring**
Grodsky et al. 2012; Reul et al. 2014, Fournier et al. 2017

**Inferring rain over oceans**
Boutin et al. 2016; Liu and Zipser, 2014; Supply et al., 2017

**ENSO forecast**
Maes et al. 2005; Zhu et al. 2014
Hackert et al. 2016, 2017

**Predicting floods & droughts**
Li et al. 2016a,b; Li et al 2018

**Ocean forecasting**
Martin et al. 2018; Boukabara et al., 2016; Toyoda et al. 2015

Highlighted at NASA 2018 climate report to US Congress
3. Opportunity for integration

- Synergies with in situ and other satellite observations
- Improving satellite SSS error budget for more meaningful integration
- Sampling errors

4. Looking ahead

**The need for continuity & enhancement**
- Accuracy – reducing uncertainties
- Resolution – monitoring mesoscale features
- Coverage – better coastal sampling

**Strategy for next decade**
- Technical innovations – simultaneous measurements by multi-beam radiometers
- Building partnerships – exploring international, domestic, and commercial spaces
QUESTIONS?
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