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# Collocated Argo-Hyperspectral Infrared Satellite Measurements: An Idea

## Measurements across the air-sea interface

- **Ideal for calibration/validation of Coupled Data Assimilation (CDA) systems**
- **But currently there is NO measurement technology/platform that would span the bottom of ocean to the top of the atmosphere.**
- **Here is an *idea* of how to *partially* fill this gap.**

## Use what is currently available

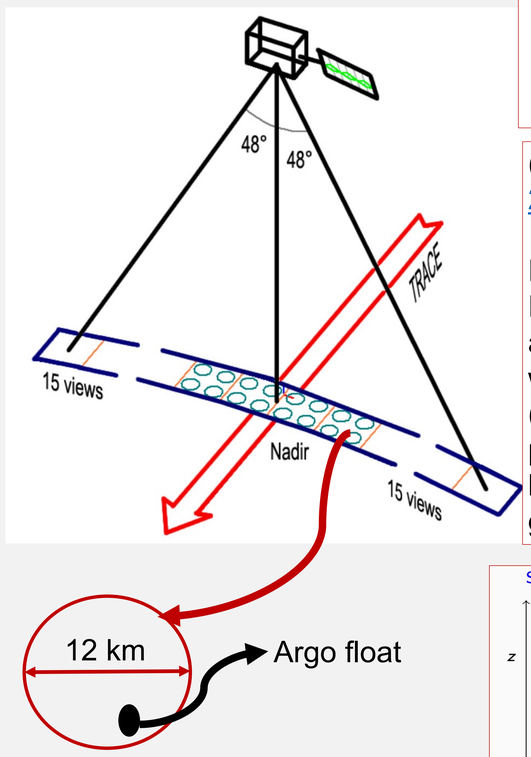
- **Argo T & S profiles**
- **Hyperspectral infrared (IR) satellite measurements**

- **Their number (HUGE) and impact on ocean and atmospheric DA systems is BIG!**
- **But they are not collocated in space and time**

## Our Idea:

**Match ascent time of Argo profiles with hyperspectral IR measurements from polar orbiting satellites**

## How would it work?

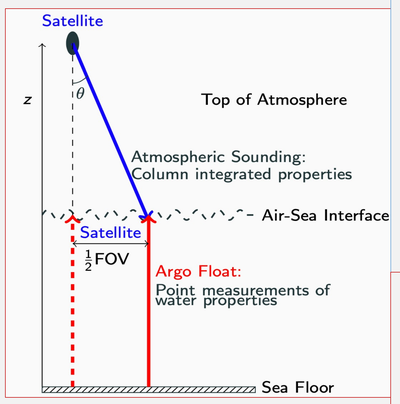



**Infrared Atmospheric Sounding Interferometer (IASI) Geometry**

(From Clerbaux et al., 2009)

IASI takes hyper-spectral IR measurements in about 2200 km swath width, each field of view (FOV) comprises of 2x2 pixels, each has about 12 km diameter footprint on ground (at nadir).

**If Argo float arises within the satellite FOV, we would *achieve* collocation.**




## What would it require for such an implementation?

- **Coordination between Argo steering committee, satellite agencies (NASA, ESA, JAXA, etc)**
- **Better understanding of variability within the satellite footprint.**
- **Satellite measurements are sensitive to near-surface conditions (micro- to centimeters), but Argo floats are not reliable at such depths (due to biofouling, punch through water), we would need to *fill in* this gap.**

## Why is it good for our community?

- **Enhances synergy between OceanPredict Task Teams**
- **DA, OS-Eval, CP task teams could contribute to it.**
- **Beneficial to weather, ocean and coupled predictions. Also, satellite retrievals and air-sea fluxes.**

## SynObs (UN Decade Project)

- **To be submitted by OceanPredict OS-Eval TT**
- **Aim to seek synergy between satellite and in-situ observations and support this idea.**

## Technical Issues:

- **Control of ascending timing** of Argo floats: Several factors determine when the float emerges (e.g., buoyancy, currents, etc), naturally it also impacts the sampling (time-of-day) of near-surface T,S
- Satellite measurement: average over the FOV
  Argo: in-situ → **representativeness** error.
- **Conversion of brightness temp. to physical temp**. By nature, CDA has a radiative transfer model.
- ***Coupled* measurement**: would comprise of BT (satellite) plus T, S (Argo).

**SUMMARY**

**We propose an approach to obtain collocated coupled measurements across the air-sea interface.**

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## MORE INFO

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