Contribution of NoR to the ESA Arctic+Salinity CCN project

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- New **advanced algorithms at L2 and L3** have been **developed** to improve the SSS accuracy and spatial resolution.
- **Run the modified L1, L2 and L3 processing algorithms from 2011 to 2022, obtaining daily SSS product of 9-day, at 25 Km (EASE-2).**

Satellite Sea Surface Salinity product development

Sea Surface Salinity

22,0   24,8   27,6   30,4   33,2   36,0

Data Min = -0,1, Max = 48.7
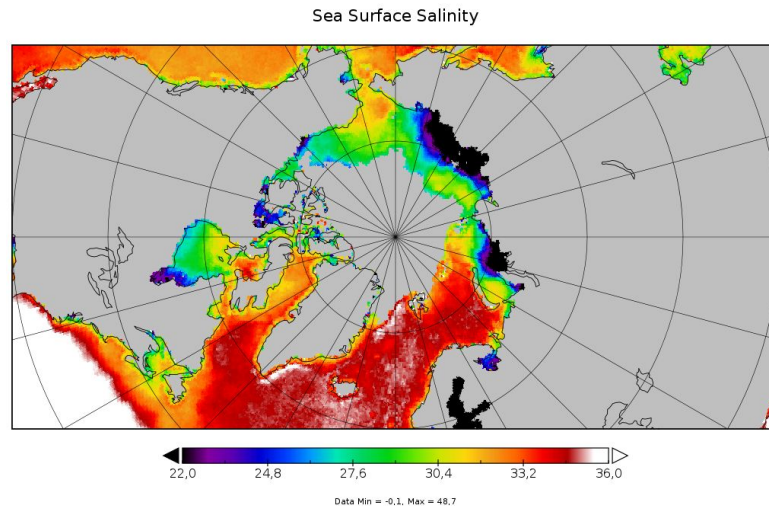
NoR computational resources

2354 days to sequentially process 12 years of data

4 months of computational time: ~88 threads (8 threads per process)

RAM depends on the processing steps: 16GB - 40GB

Regarding disk usage, the total project weights 84.8 TB.

- The cloud space: 24.6 TB
- Generated files: 50.2 TB
- Working space: 10 TB

Data transfer: 24.6 TB uploaded by ESA / EarthConsole

We used **Earth Console** provider with 3 VMs G-BOX HOS Type E

Preparation and processing in NoR facilities

14th September 2022 · *22nd November 2022* · *February 2023*

| KOM | | PM#1 | ··· | Resources available |
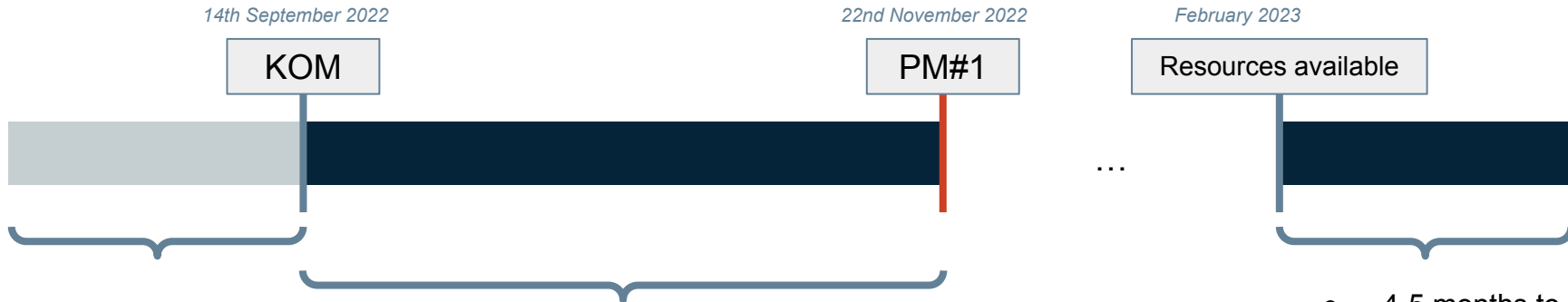
- Adaptation of the code to be deployable in external environments
- Interactions with Earth Console to perform and try their computing resources
- Deployment of the code to Earth Console VMs' and collecting execution times & resources data (1)

- Assessment of computation needs from execution test data (1)
  - Interactions with EC team
  - Output: defined resources list
- Implementation and testing of Arctic+ CCN algorithms
  - All deployable code is complete
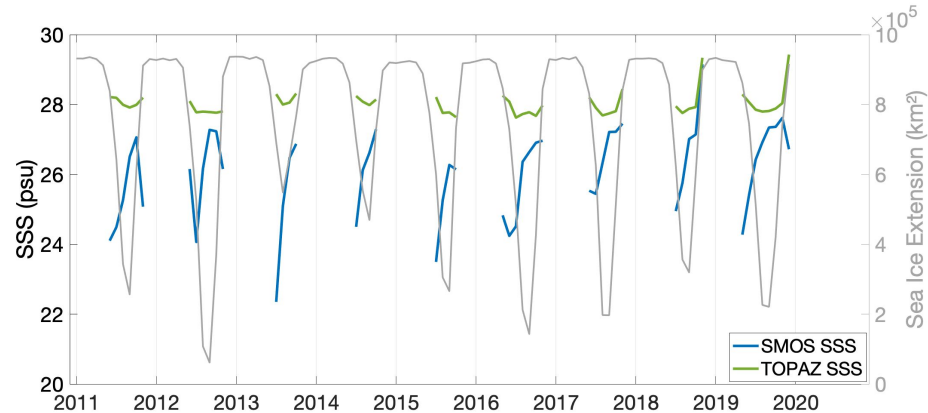- Generation of calibration files to cover the full period

- 4-5 months to generate the final product

Liquid freshwater content (FWC) in the Beaufort Gyre has considerably increased over the last two decades (based on in situ, GRACE and altimetry).
Now we can measure it with SMOS SSS data.

SMOS
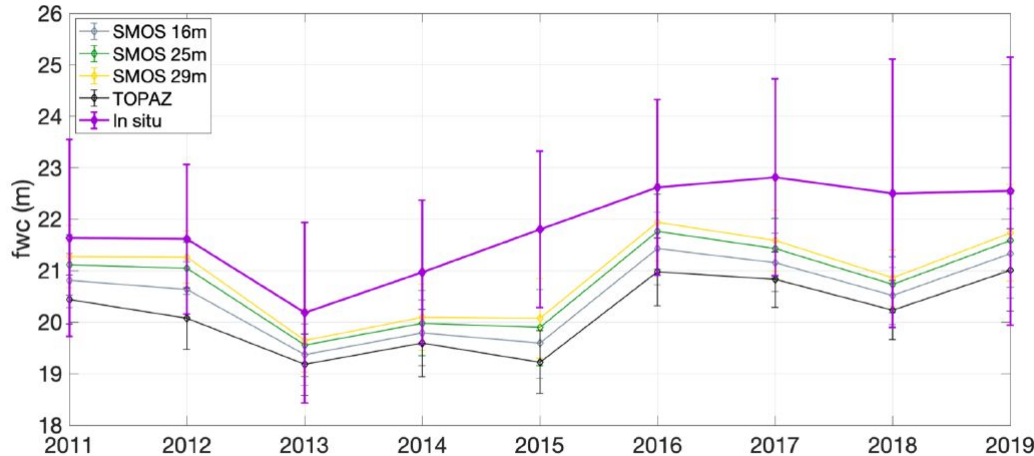
2011   2016
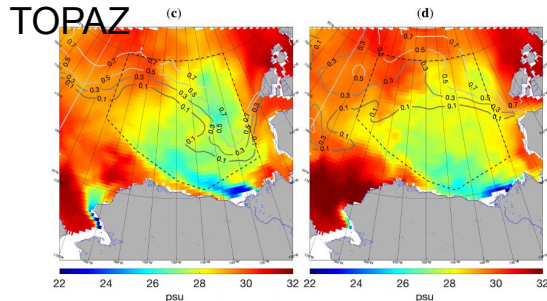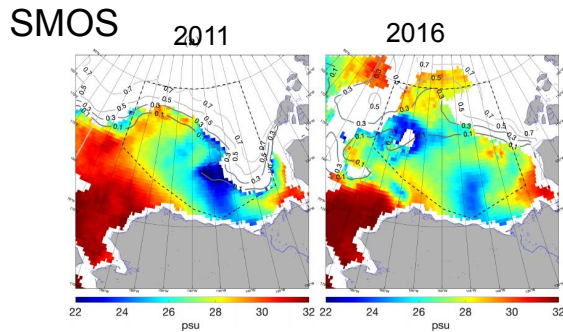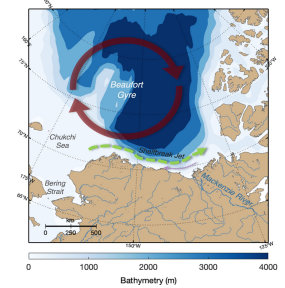
SMOS SSS is fresher than TOPAZ 4b surface salinity.

TOPAZ

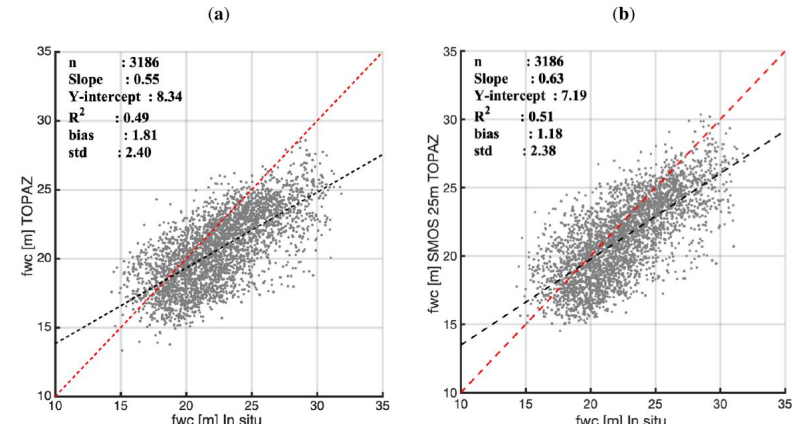Published paper: Umbert et al. 2023 https://doi.org/10.5194/egusphere-2023-1510

BEC

Estimation of the **Liquid freshwater content in the BG and the impact of including SMOS SSS in the mixed layer depth (MLD).**

> **SMOS data improves the FWC budget computation in the BG with respect modelling data**

Higher FWC is found with SMOS SSS than TOPAZ SSS:

1) mean increase of 5%
2) 10% maximum in periods of maximum SMOS coverage.

THANKS

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Barcelona Expert Center