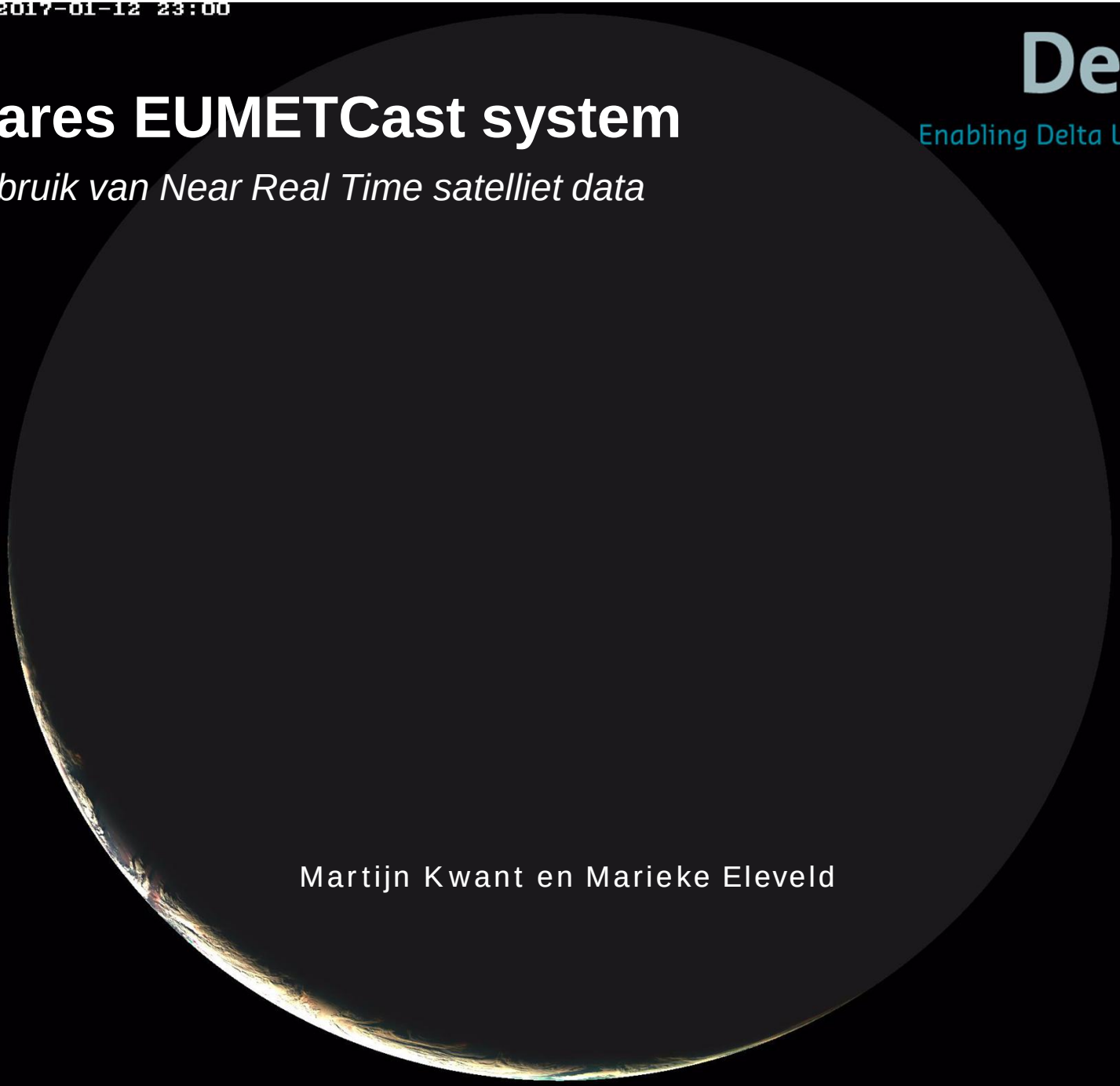
Deltares EUMETCast system

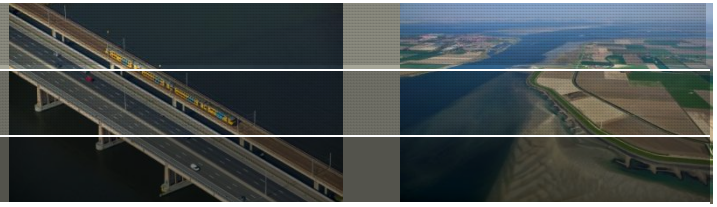
Het gebruik van Near Real Time satelliet data

Deltares
Enabling Delta Life



Martijn Kwant en Marieke Eleveld

Inhoud

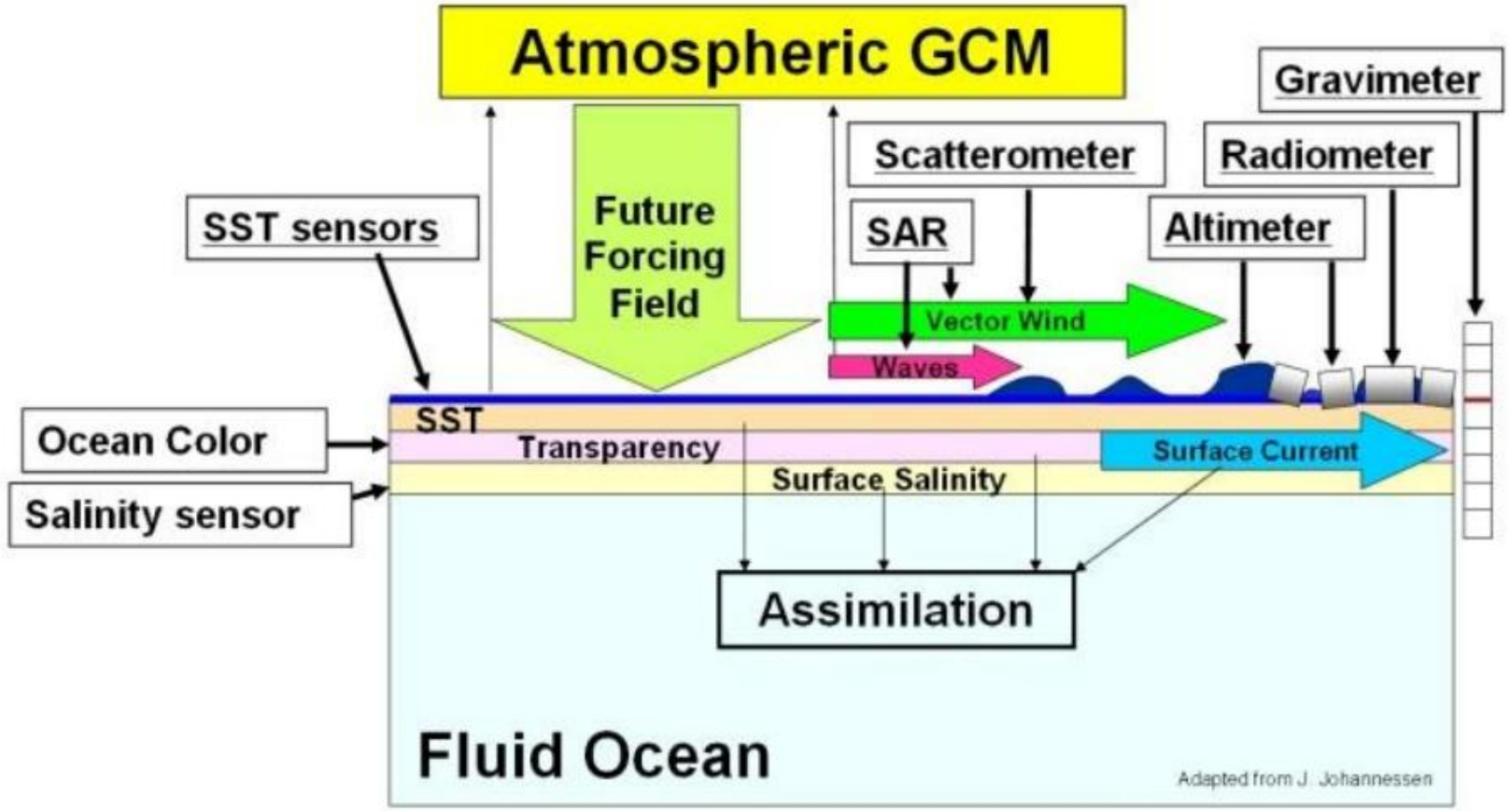


- Introductie EUMETCAST en de sentinel satellieten
- Experimenteren met Sentinel-3, -2, -1 … toekomstige plannen

marktplaats.nl

Waarom NRT satelliet data gebruiken?

*Het begrijpen van natuurlijke processen op Aarde **is cruciaal** voor **duurzame ontwikkeling** en om mensheid en mileu te beschermen.*



***Satelliet observaties van de Aarde** worden wereldwijd herkend als **fundamentele input** om deze kennis te ontwikkelen.*

Drinkwater et.al. 2012

Deltares

Waarom NRT satelliet data gebruiken?

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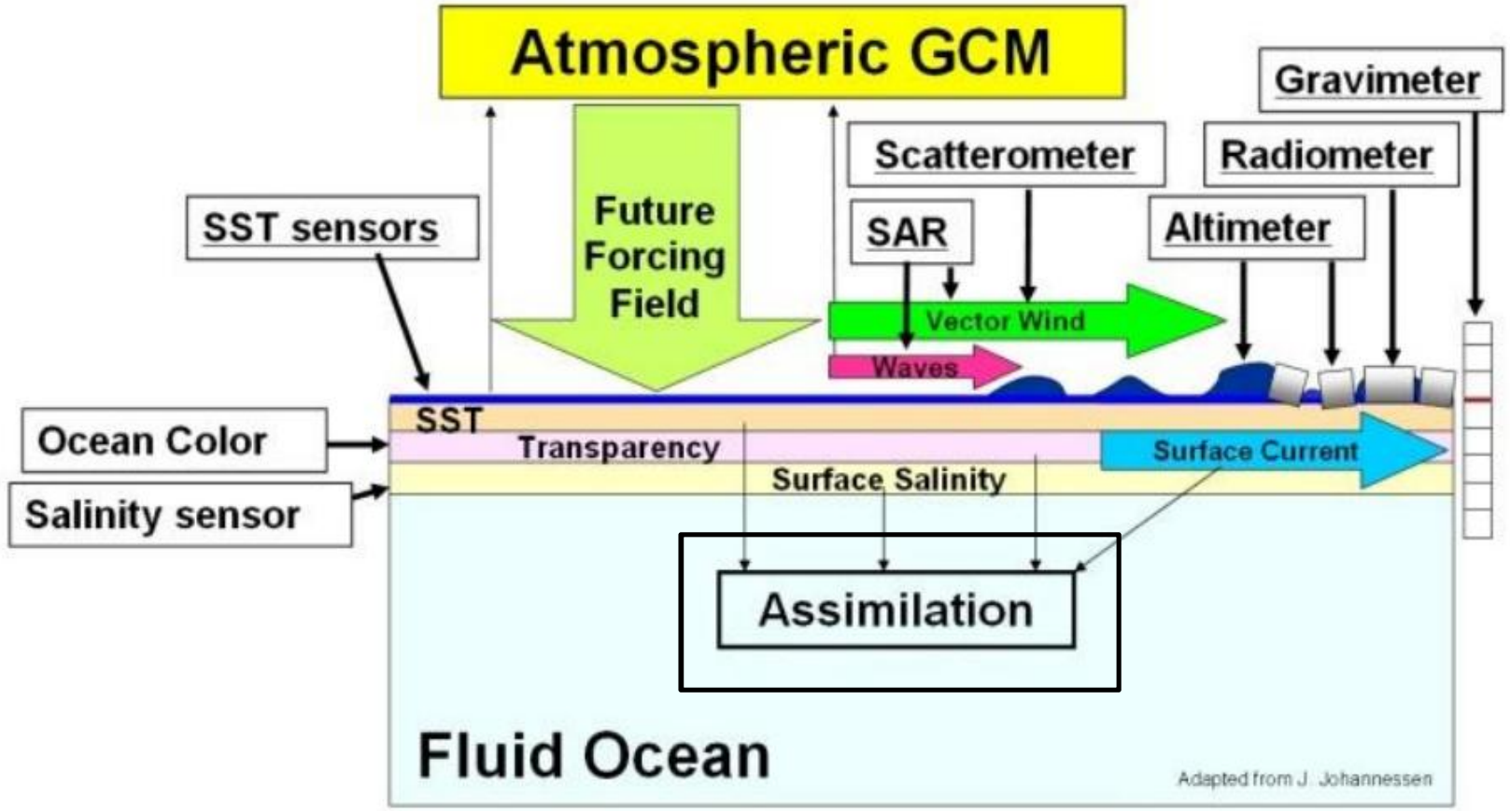


***Satelliet observaties van de Aarde** worden wereldwijd herkend als **fundamentele input** om deze kennis te ontwikkelen.*

Drinkwater et.al. 2012

Deltares

Waarom nu?

- Fourth Paradigm – Jim Gray
  - *We are in the midst of a series of scientific breakthroughs powered by advanced computing capabilities that help researchers manipulate and explore massive (inter-disciplinary) datasets*

The
FOURTH
PARADIGM

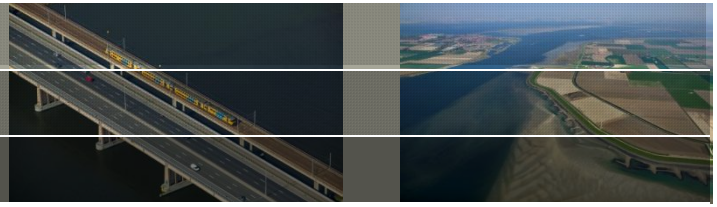
DATA-INTENSIVE SCIENTIFIC DISCOVERY

EDITED BY TONY HEY, STEWART TANSLEY, AND KRISTIN TOLLE

"The impact of Jim Gray's thinking is continuing to get people to think in a new way about how data and software are redefining what it means to do science."

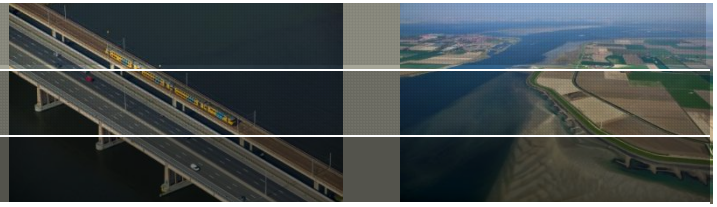
—BILL GATES

De drempel



1. Toegang tot data
   - Snel systeem nodig om data te verspreiden
   - 100% dekking (Copernicus continuation “vervolg” service)

De drempel



1. Toegang tot data

- Snel systeem nodig om data te verspreiden
- 100% dekking (Copernicus continuation “vervolg” service)

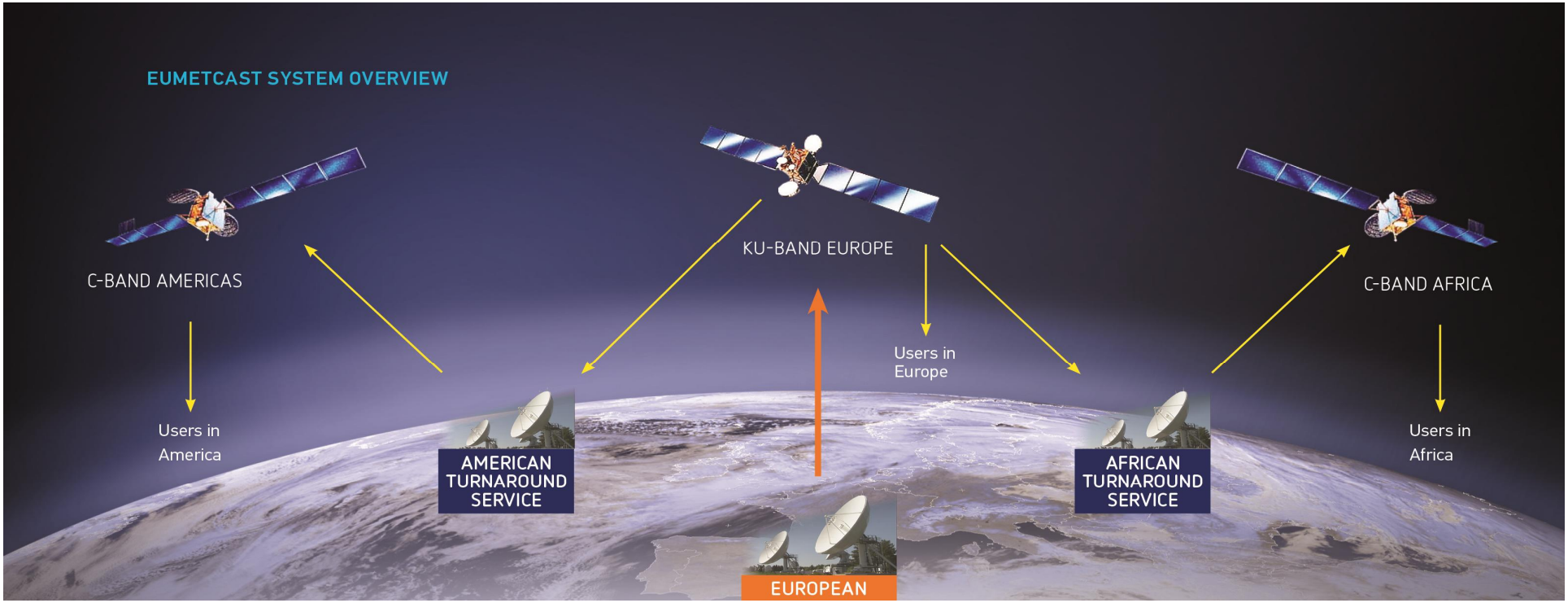
2. Verwerking

- Capacity building, remote sensing kennis nodig
- Data assimilatie benodigd veel rekenkracht van computers
- Nauwkeurigheid (fout) in de in-situ, model en satelliet data worden bestudeerd voor assimilatie

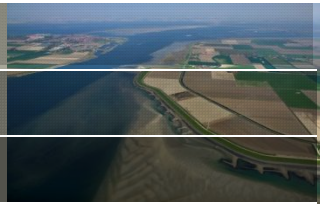
presenteer: het EUMETCAST Systeem

- EUMETCast: een service gebruikt om satelliet data te verspreiden in Near Real Time (NRT)

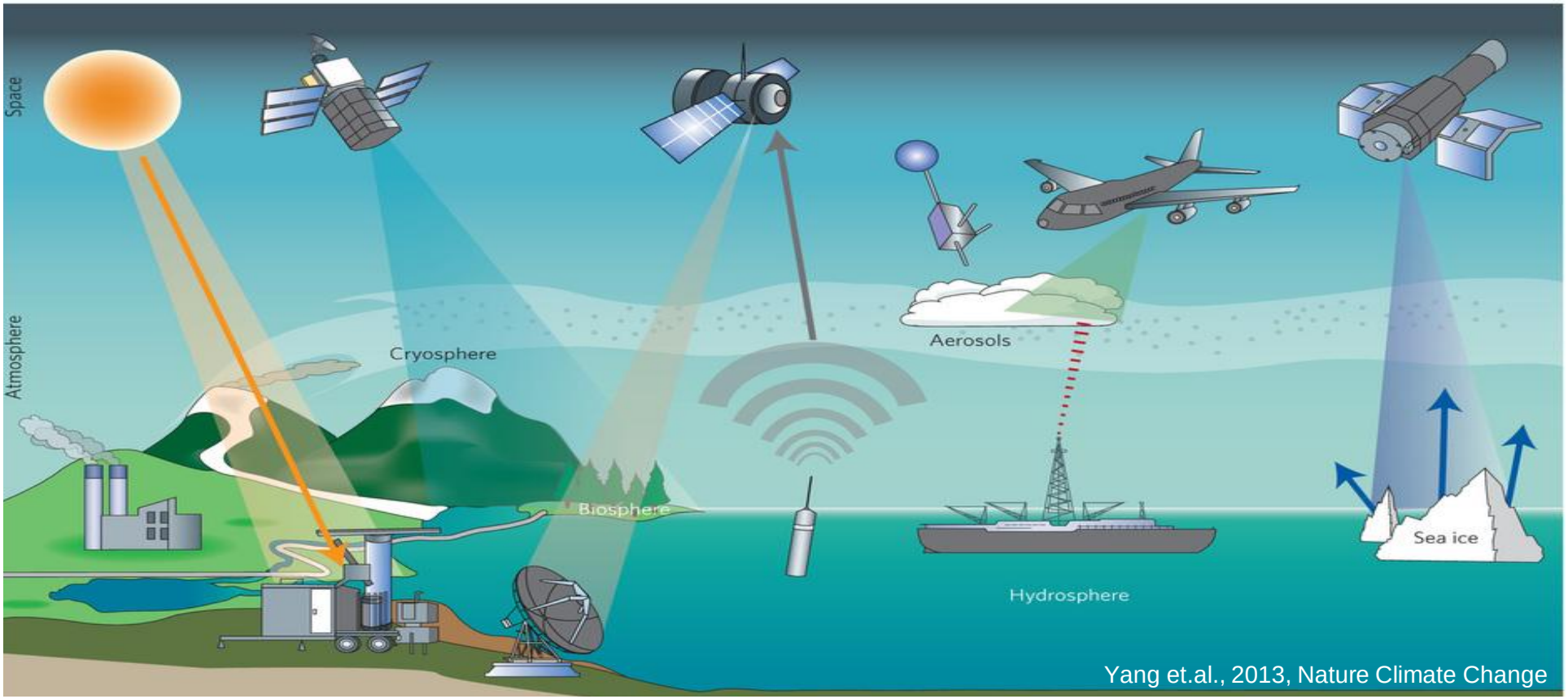
  - **Beschikbaar binnen 0.5 - 3 uur na meting!**
  - Data binnen Deltares opgeslagen op het Deltares Datacenter



Visie



*In 2020, zal satelliet data **naadloos geïntegreerd zijn** in operationele modellen en projecten binnen Deltares, waarmee onze kennis van **globale processen op Aarde** wordt vergroot.*



Yang et.al., 2013, Nature Climate Change

Visie

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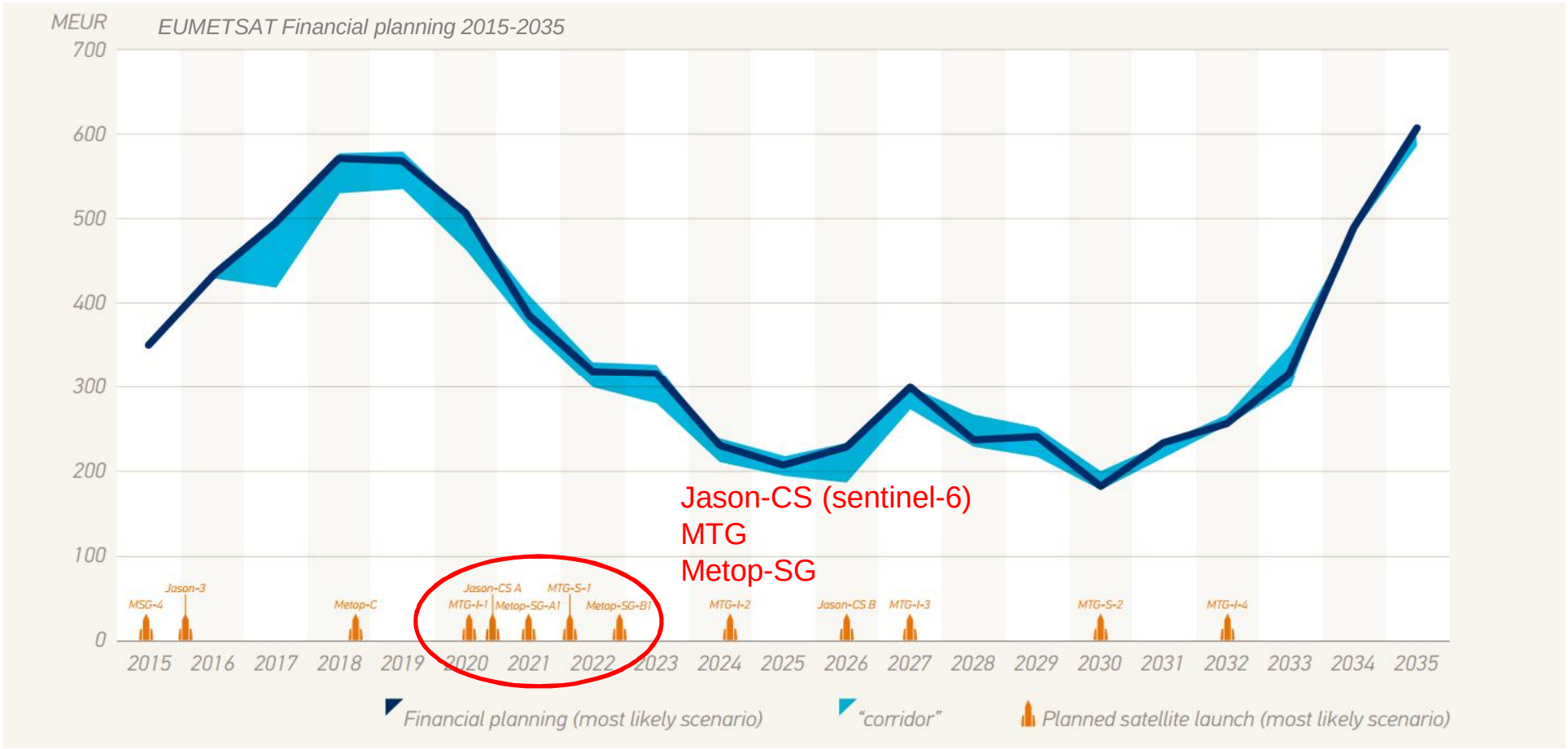
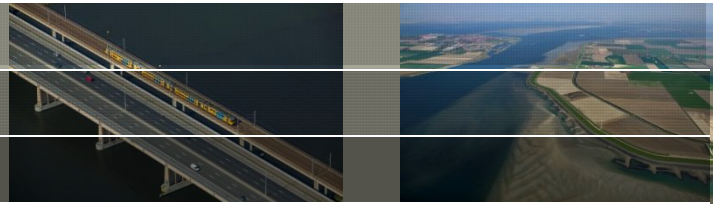
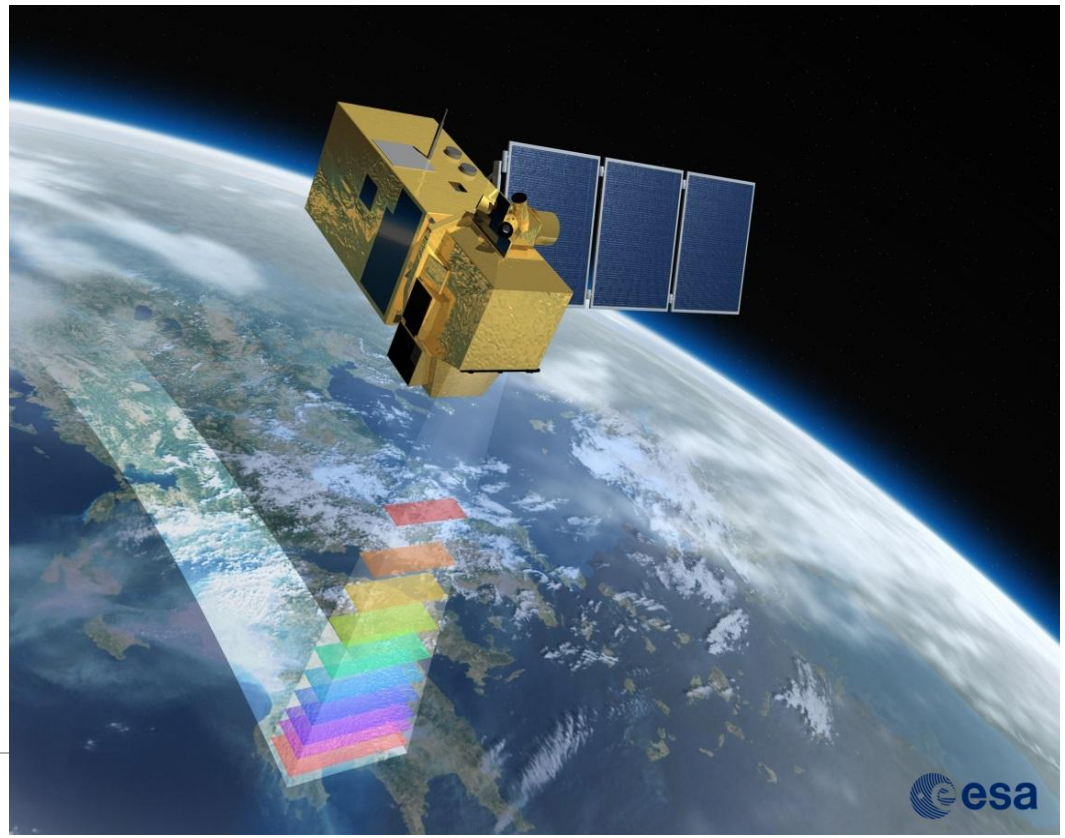


Wat we nu doen



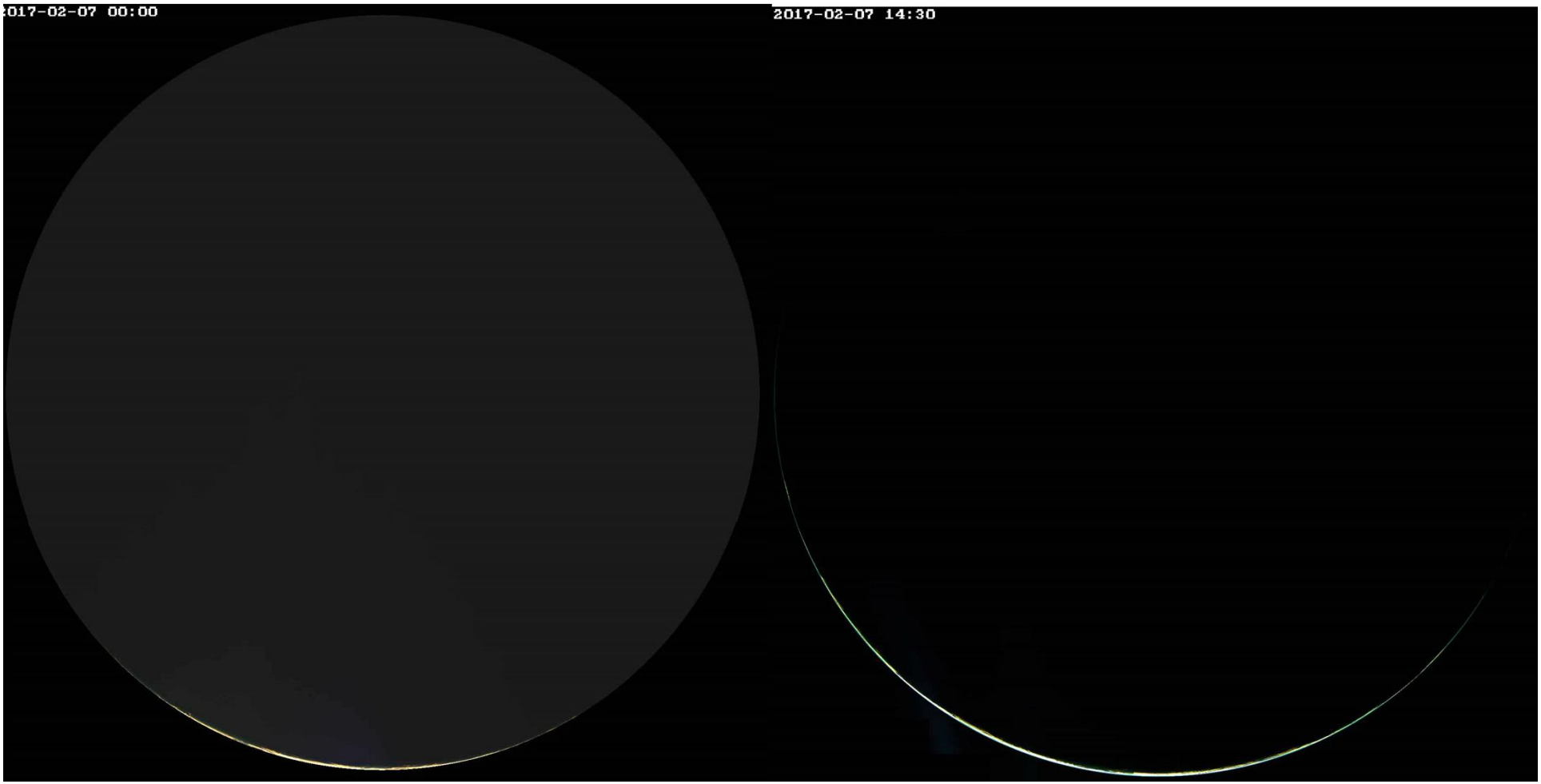
- Satelliet data invoeren in operationele modellen
- Analyse tijdens extreme weersomstandigheden
- Validatie activiteiten (Sentinel-3, 2)



Voorbeelden van EUMETCast Data

Meteosat-10

Himawari-8

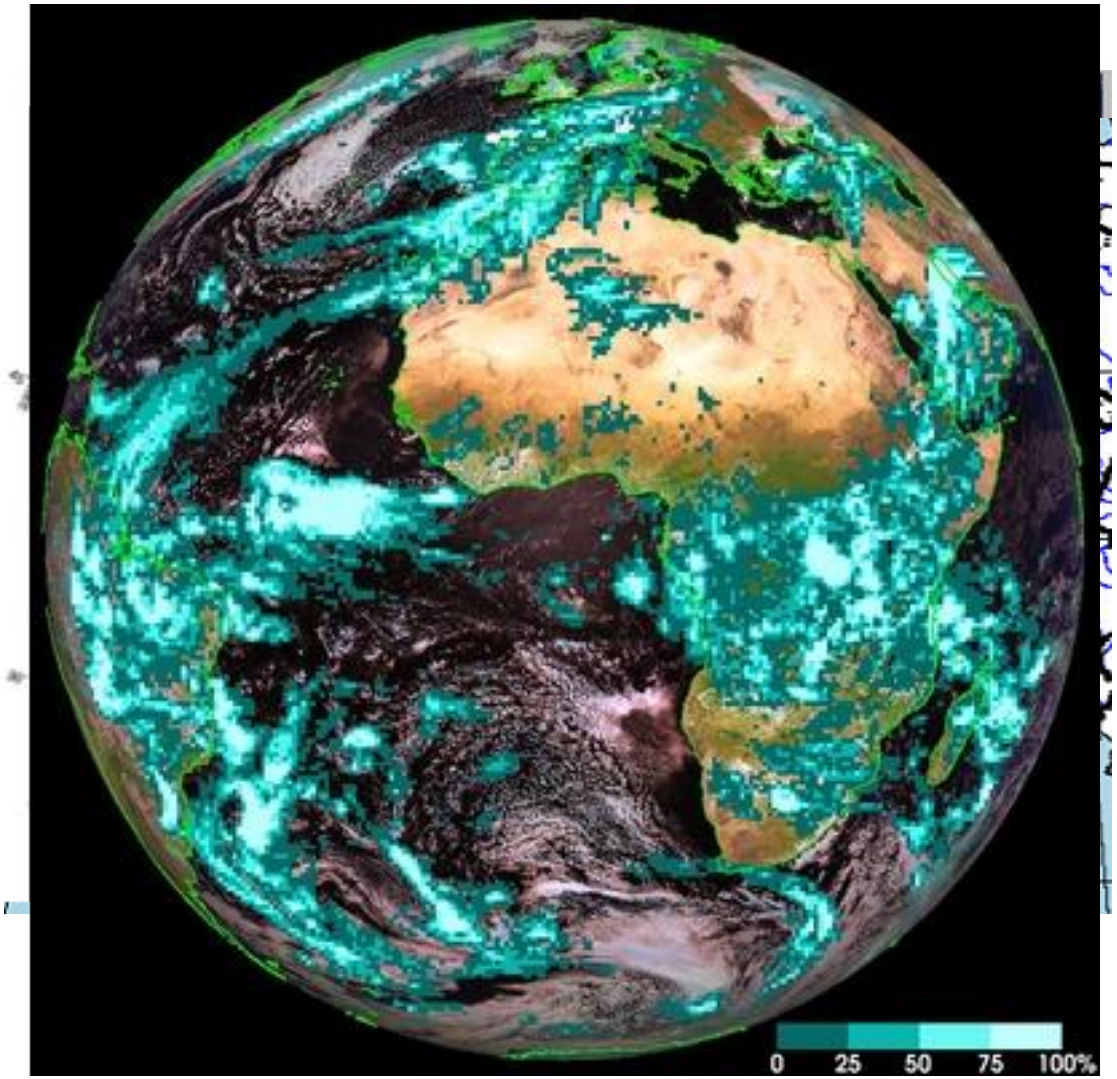


Copyright EUMETSAT 2017

Deltares

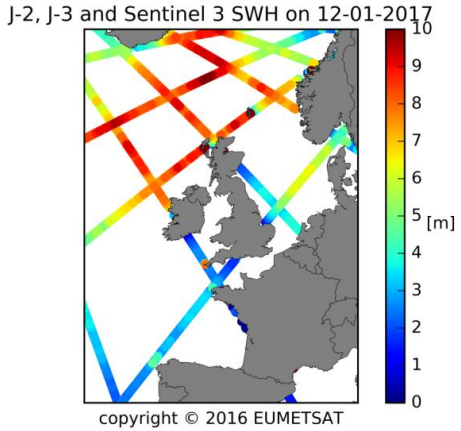
De mogelijkheden

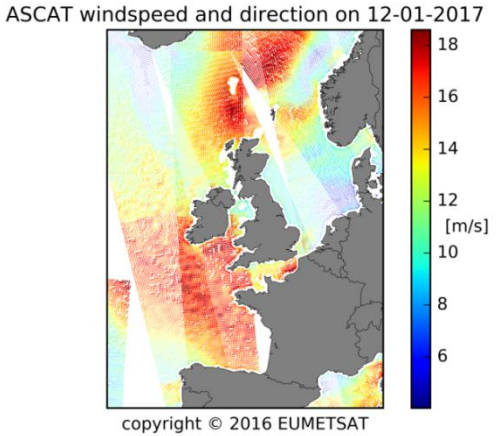
- Sea level anomaly
- Wind speed
- Fire
- Soil moisture
- NDVI
- Precipitation
- Clouds

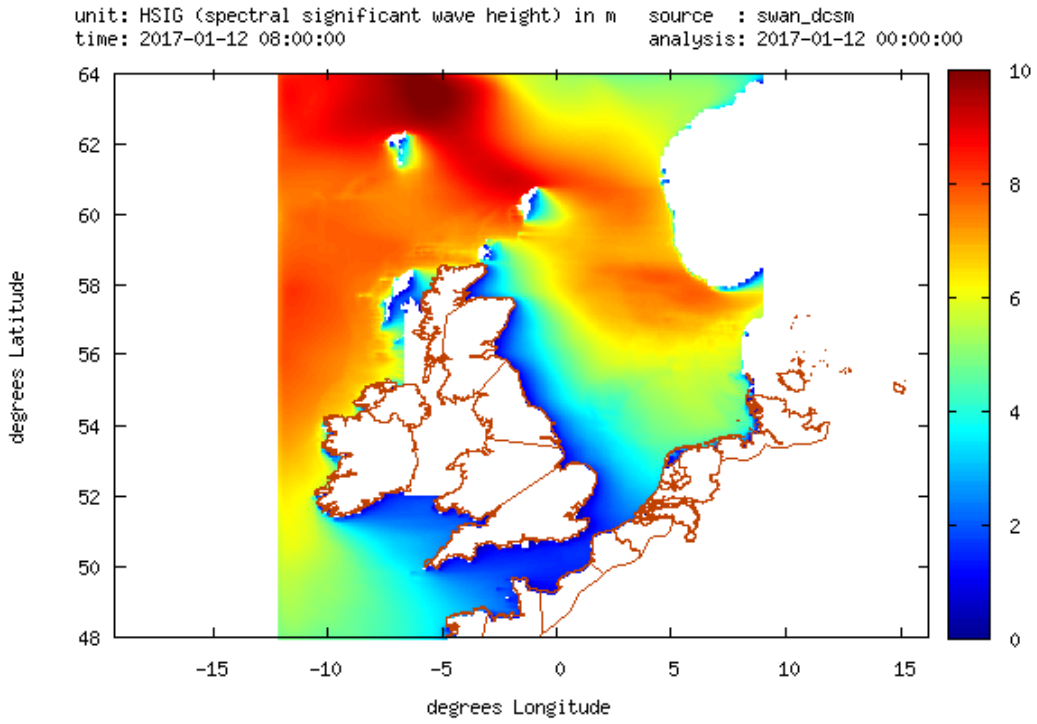


Extreme weersomstandigheden

- Kwantitatieve vergelijking met het Swan DCSM model





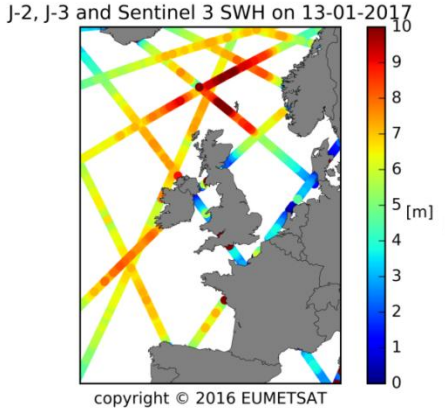


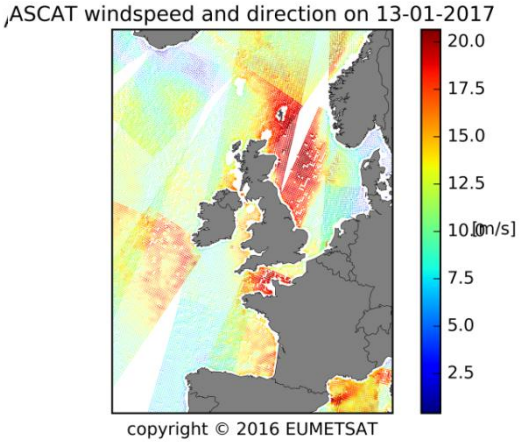
- Jan 12th

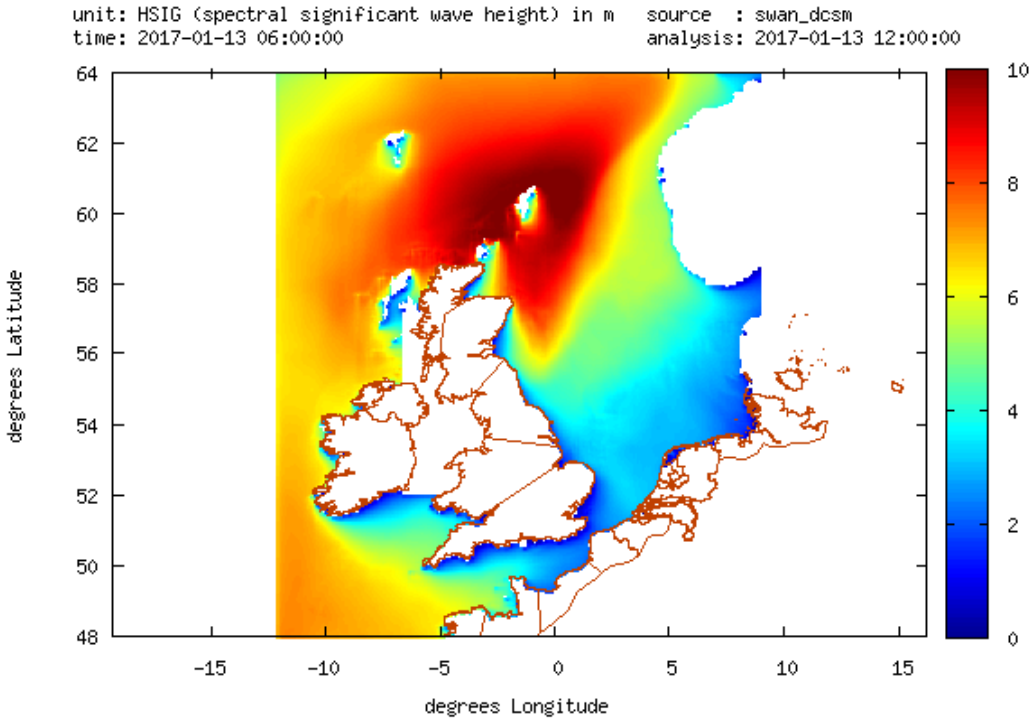
Deltares

Extreme weersomstandigheden

- Kwantitatieve vergelijking met het Swan DCSM model



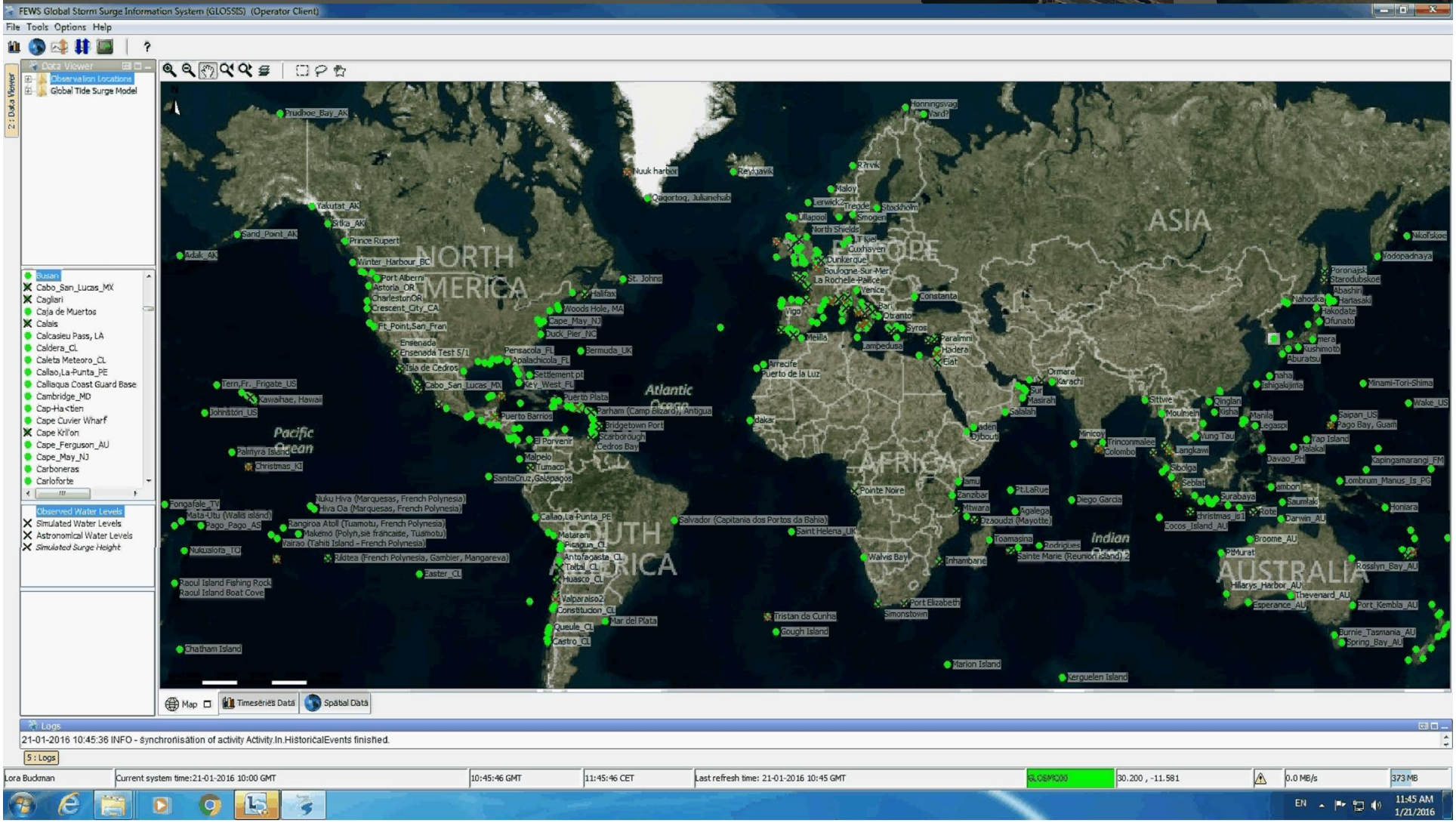




- Jan 13th

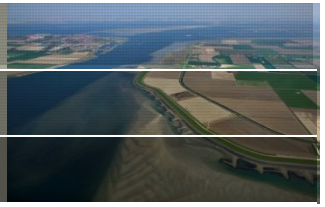
Deltares

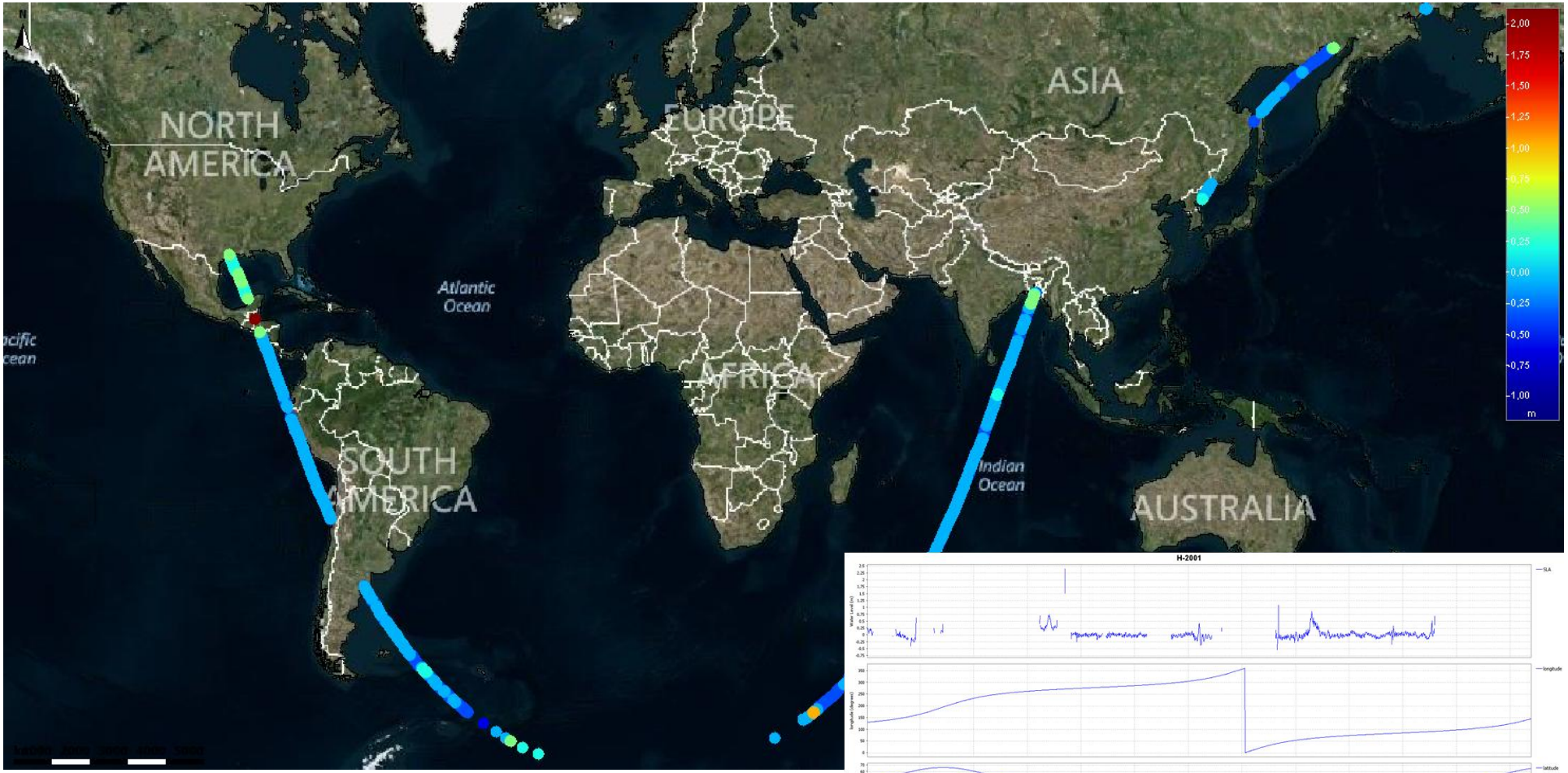
Getijdemetingen in GLOSSIS



Deltares

JASON-3 waterstanden



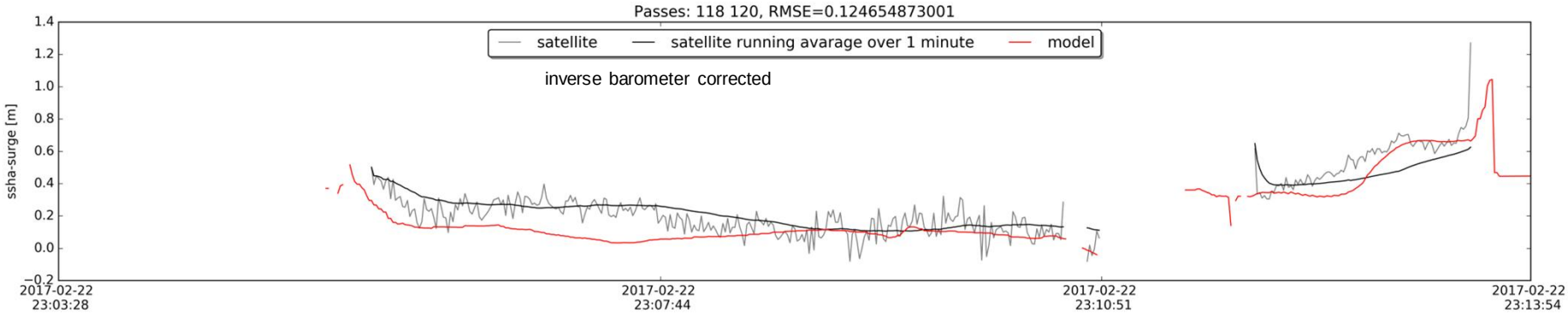


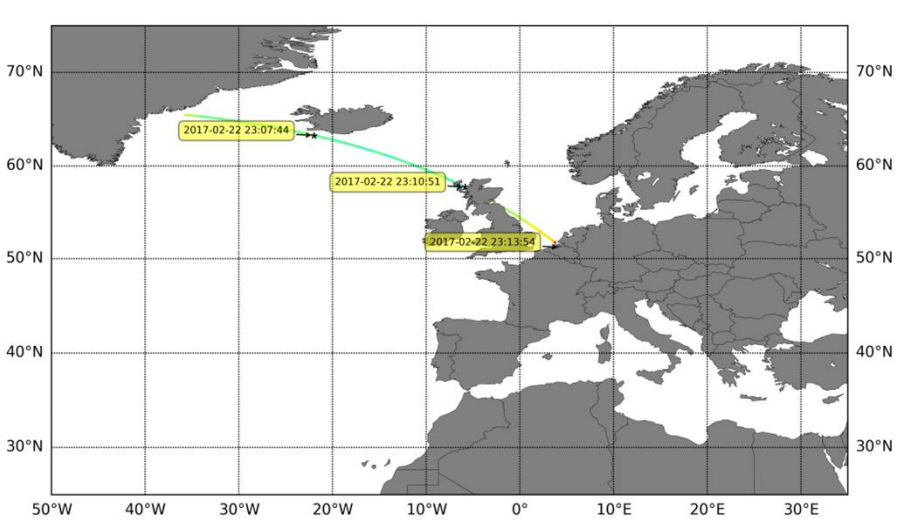
EUMETSAT Deltares

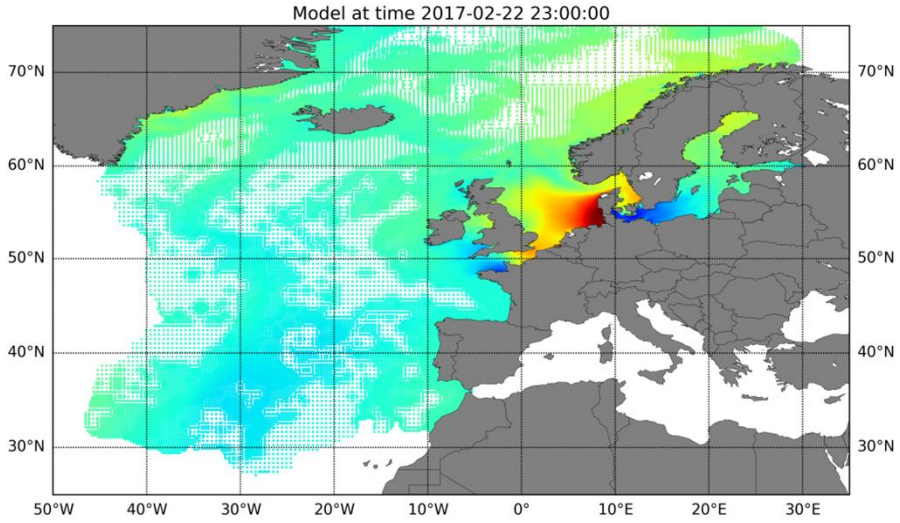
Vergelijking van waterlevel data van Sentinel-3 met model resultaten uit GLOSSIS

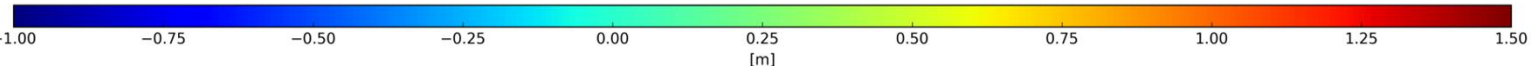
Example: storm on 22th February 2017

Valentina Premier
ERASMUS trainee
Università degli Studi di Trento, Deltares

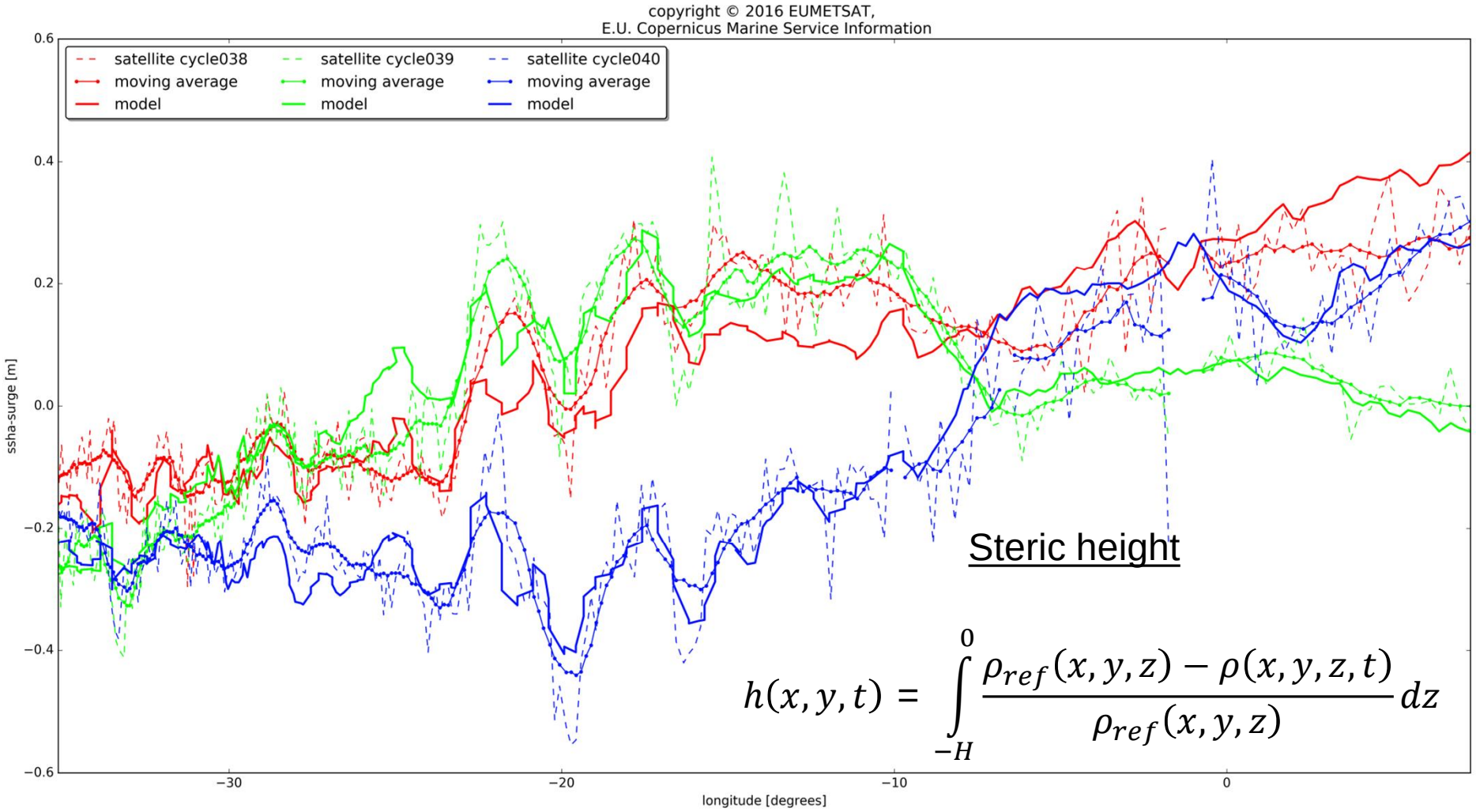








Analyse van SSHA van altimeter met GLOSSIS



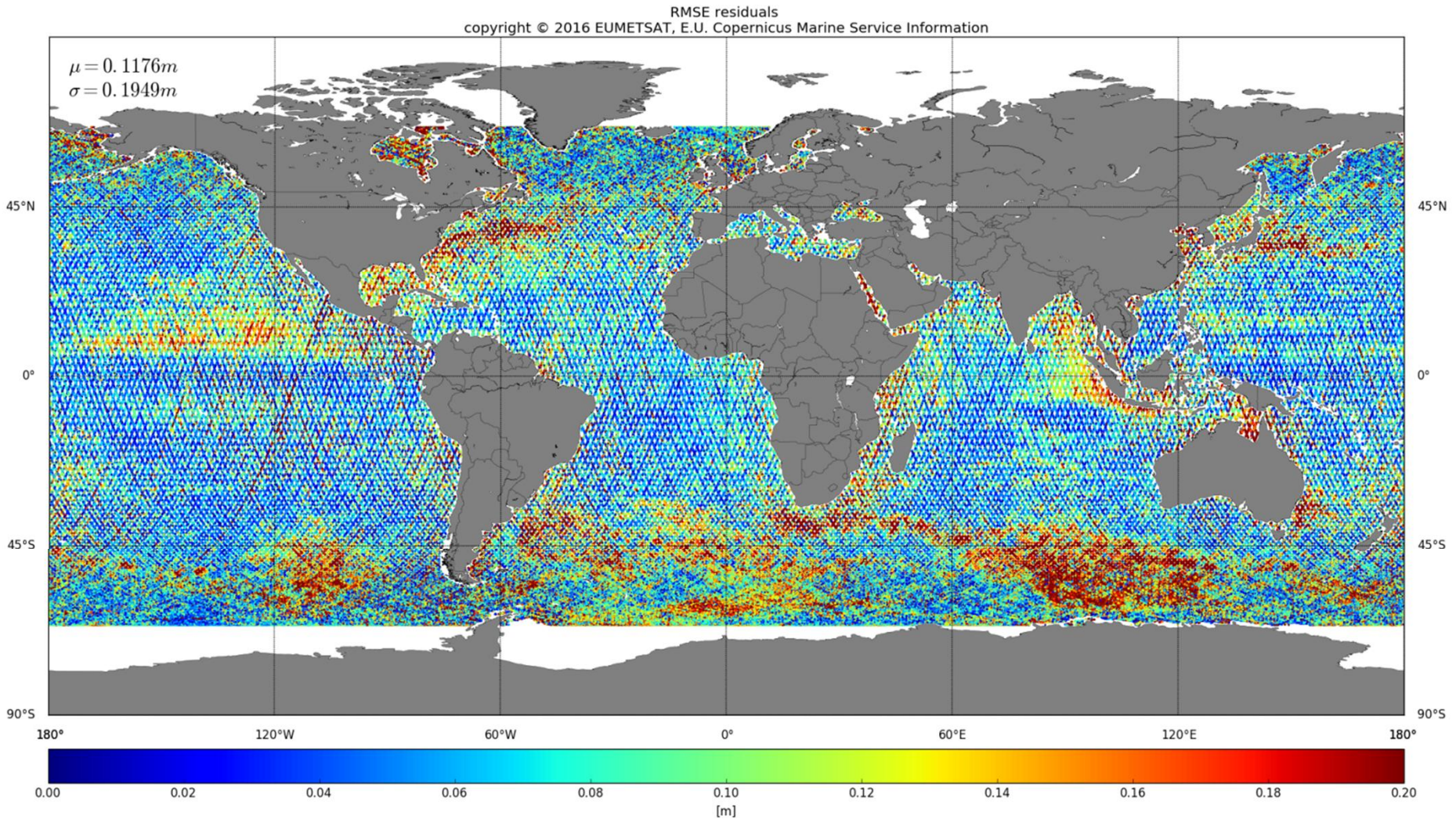
Steric height

$$h(x,y,t) = \int_{-H}^{0} \frac{\rho_{ref}(x,y,z) - \rho(x,y,z,t)}{\rho_{ref}(x,y,z)} dz$$

Future goals: Long term and global world analysis

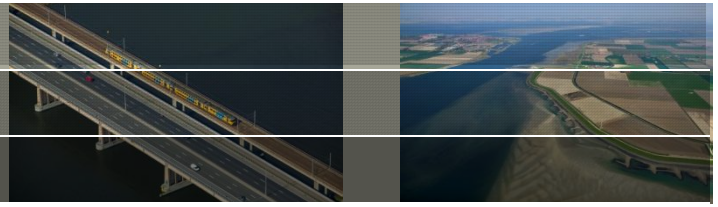
Deltares

Analyse van SSHA van altimeter met GLOSSIS

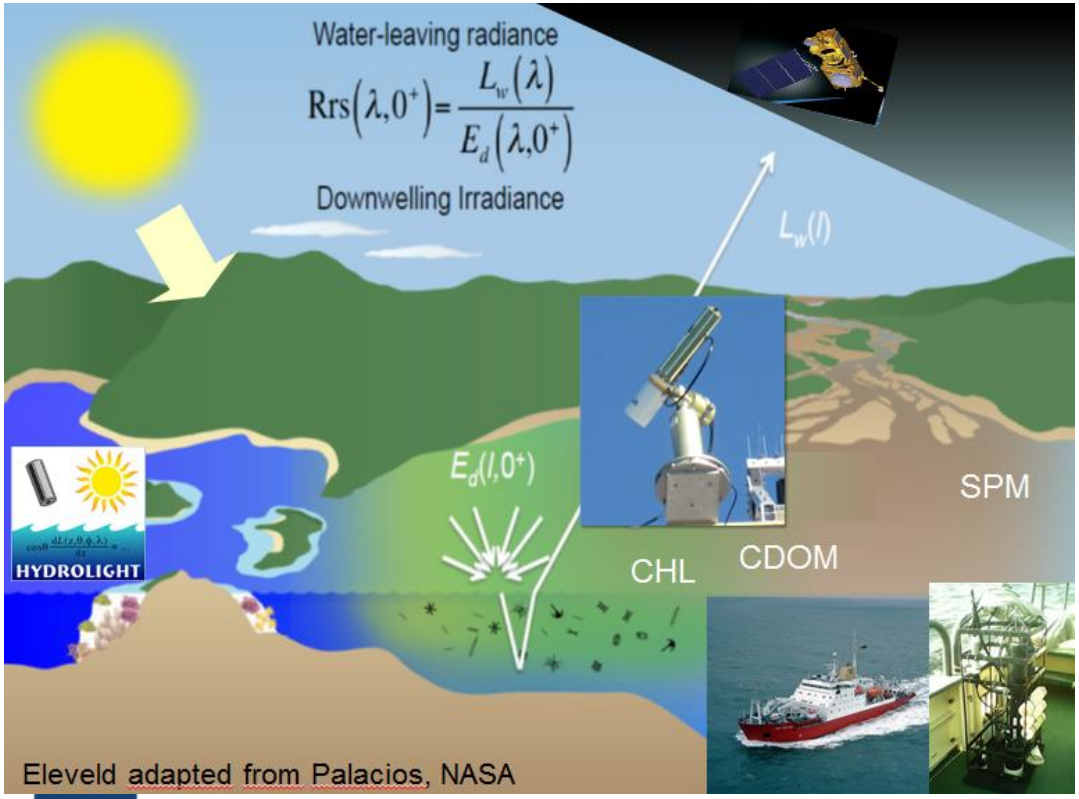


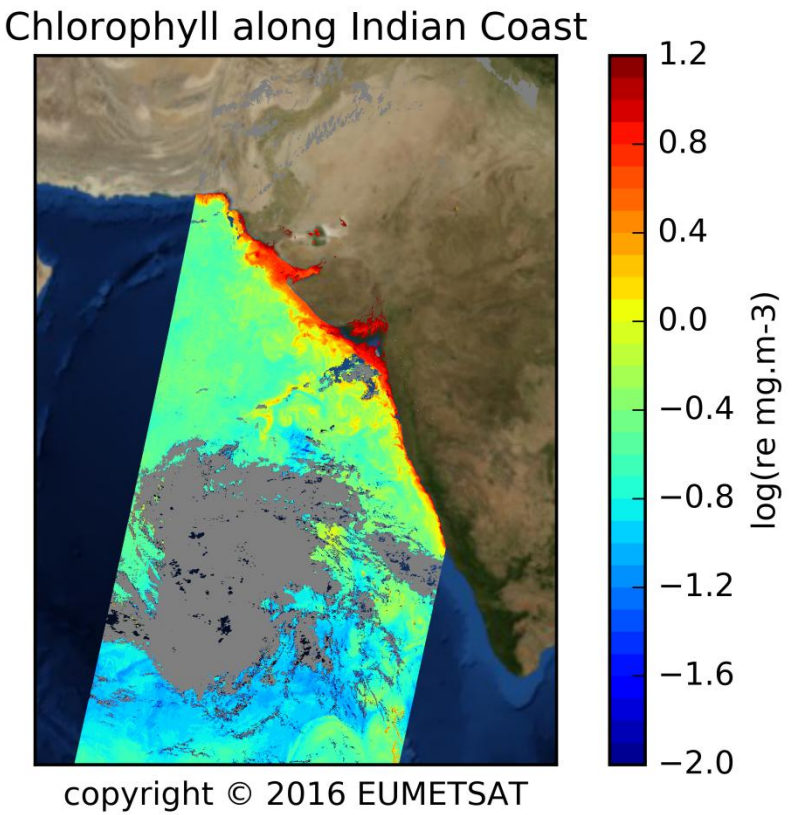
Deltares

Sentinel-3 ValidatieTeam



- Wereld wijd als eerste toegabg tit Sentinel-3 data
- Sentinel-3 OLCI L2 Chlorophyll / SPM validatie



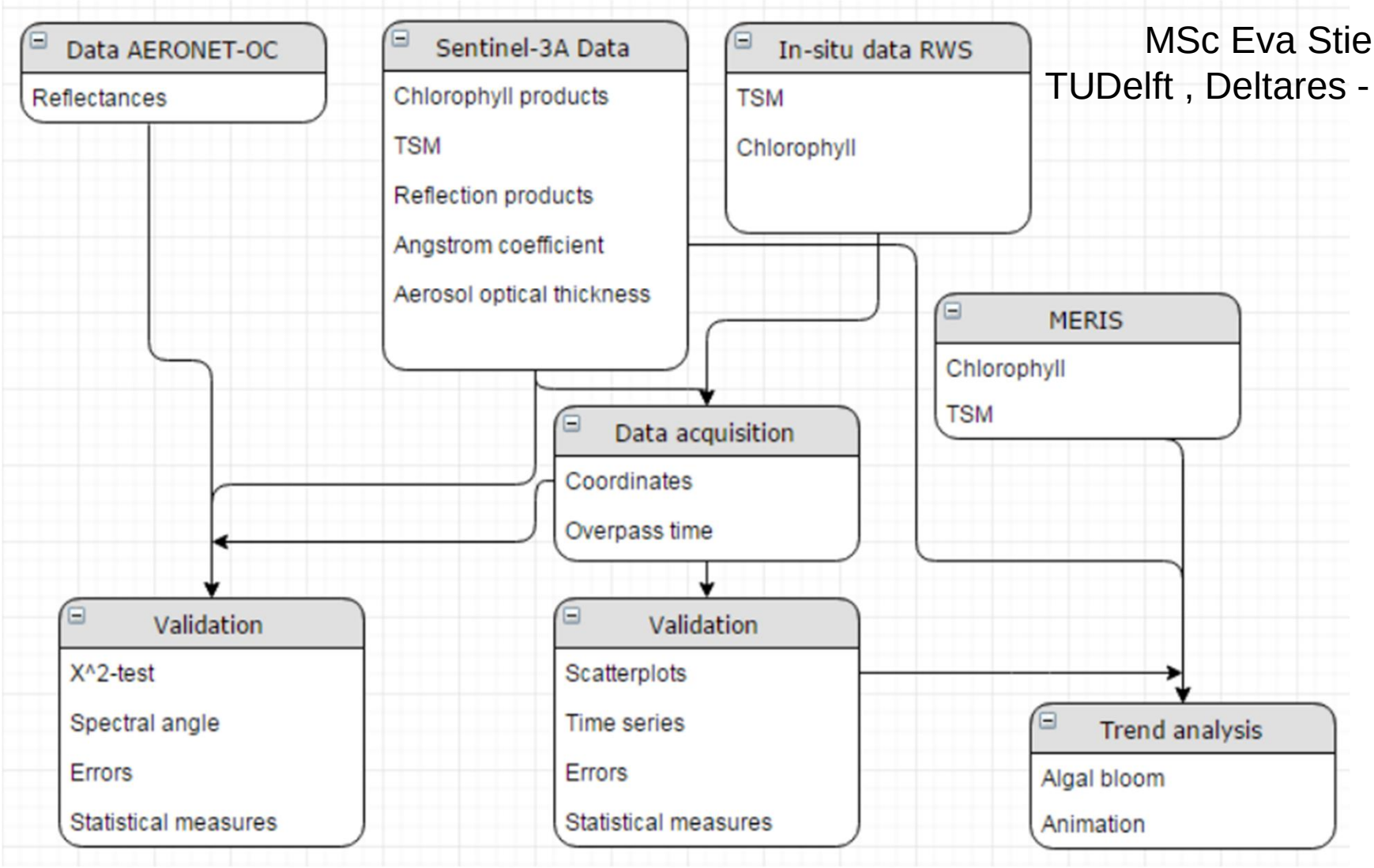


Rijkswaterstaat
Ministry of Infrastructure and the Environment

Deltares

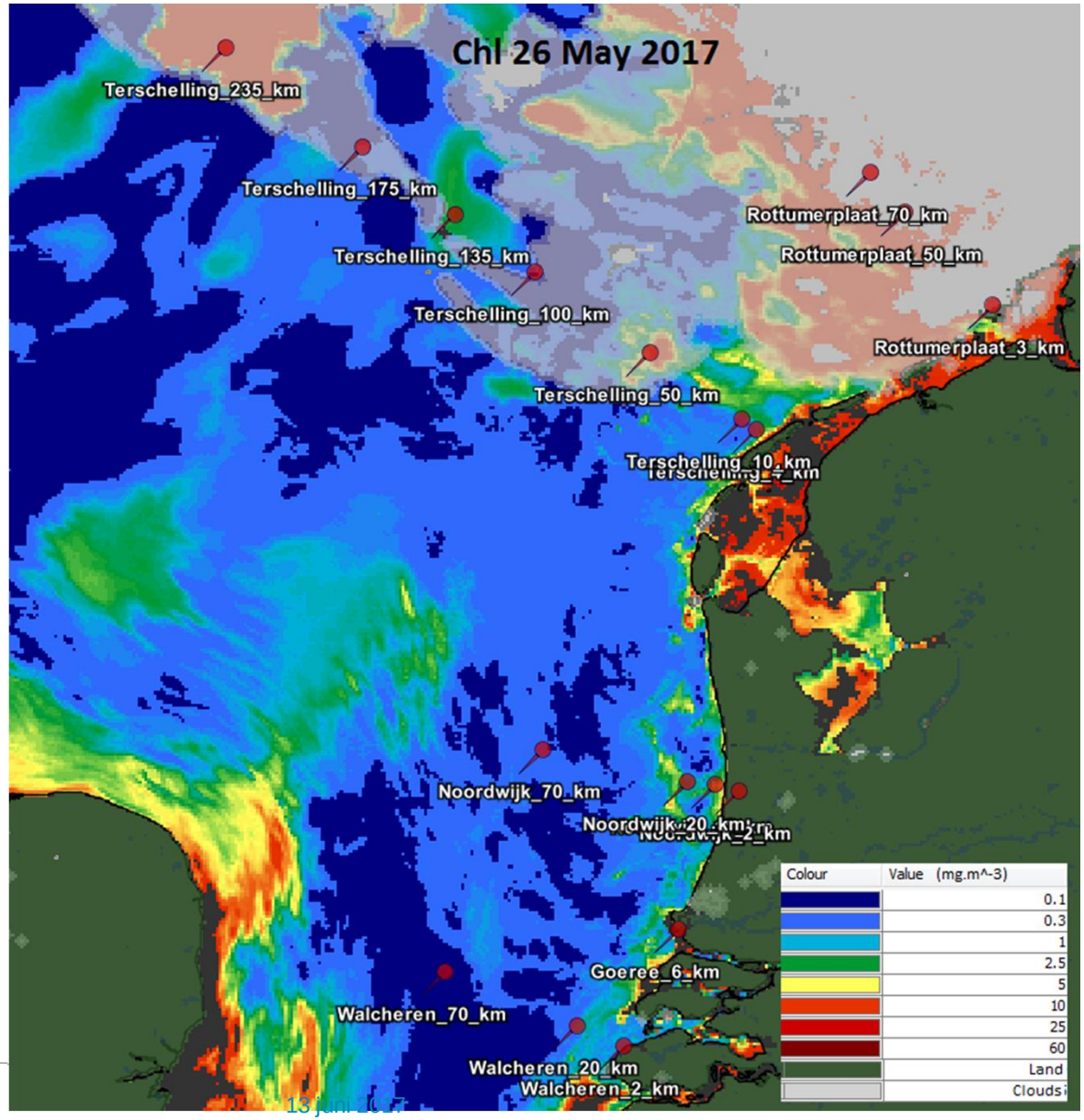
Monitoren van water kwaliteit met satelliet data: validatie (Deltares S3VT)

MSc Eva Stierman
TUDelft , Deltares - RWS



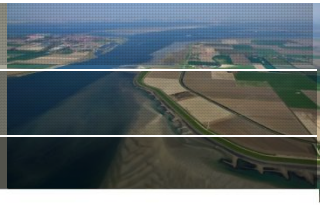
Deltares

Monitoren Chl percentage met Sentinel-3 data



Deltares

Validatie activiteiten

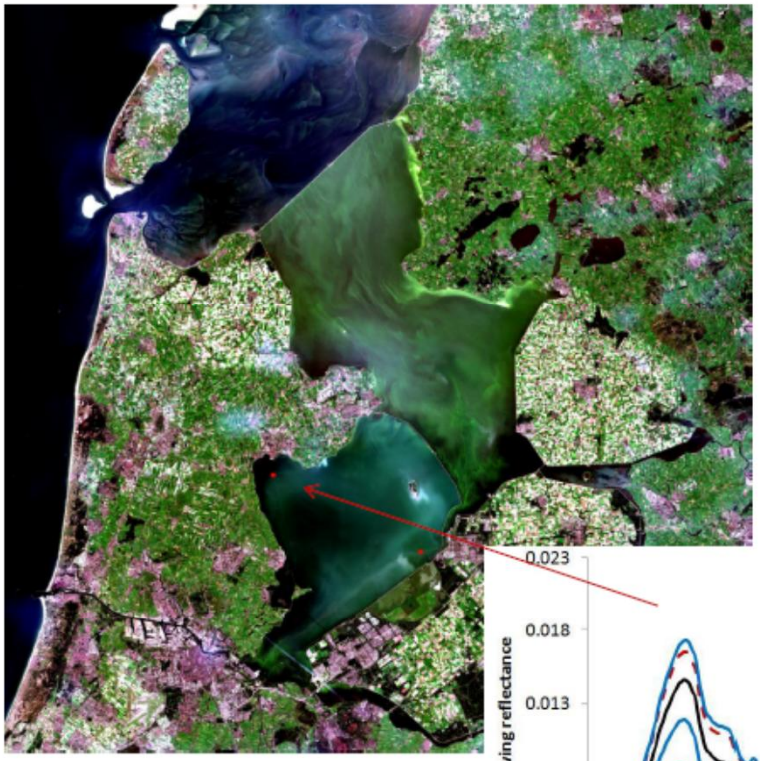


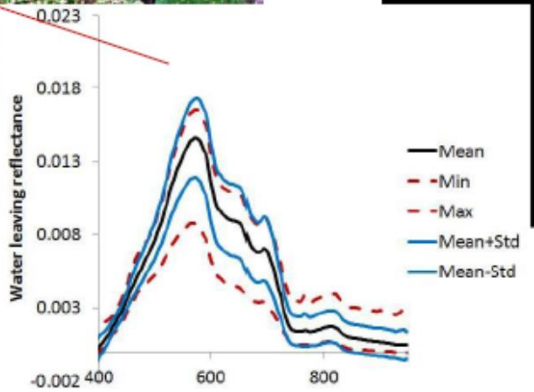
INFORM Sentinel-2A MSI Validation Campaigns at Lake Marken

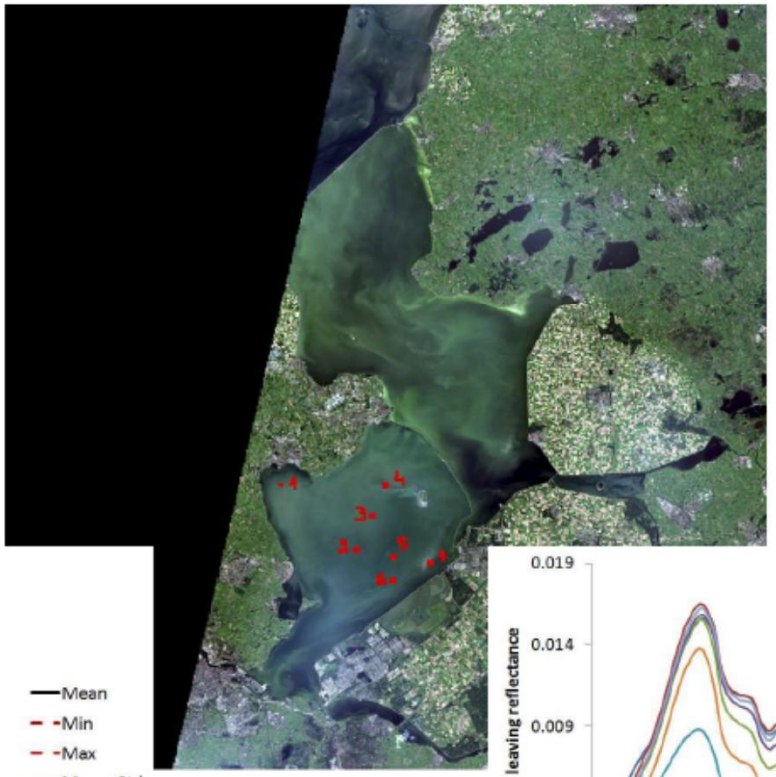
Ils Reusen (ils.reusen@vito.be), Liesbeth De Keukelaere, Wesley Boënne, Sindy Sterckx, Els Knaeps (VITO)
Peter Hunter, Evangelos Spyrakos, Jozef Rusin, Matthew Blake, Andrew Tyler (U Strirling)
Miguel Dionisio Pires, Meinte Blaas, Marieke Eleveld (Deltares)

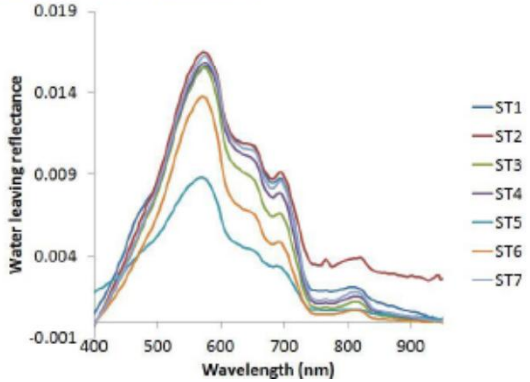
Parameters:
Pigments: Chl-a, PC, HPLC
Carbon: DOC, POC, CDOM
Sediment: SPM; SPIM, SPOM, PSD*
Phytoplankton counts*
Primary production (14C incubations)*
OD.AOPT Microtops II CIMEL sun photometer
Water-leaving reflectance (HyperSAS/RAMSES/WISP-3)
Underwater (ir)radiance depth

Markermeer campaigns at S2VT (Reusen et al., 2016)



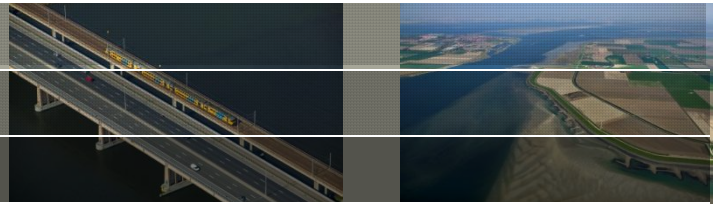


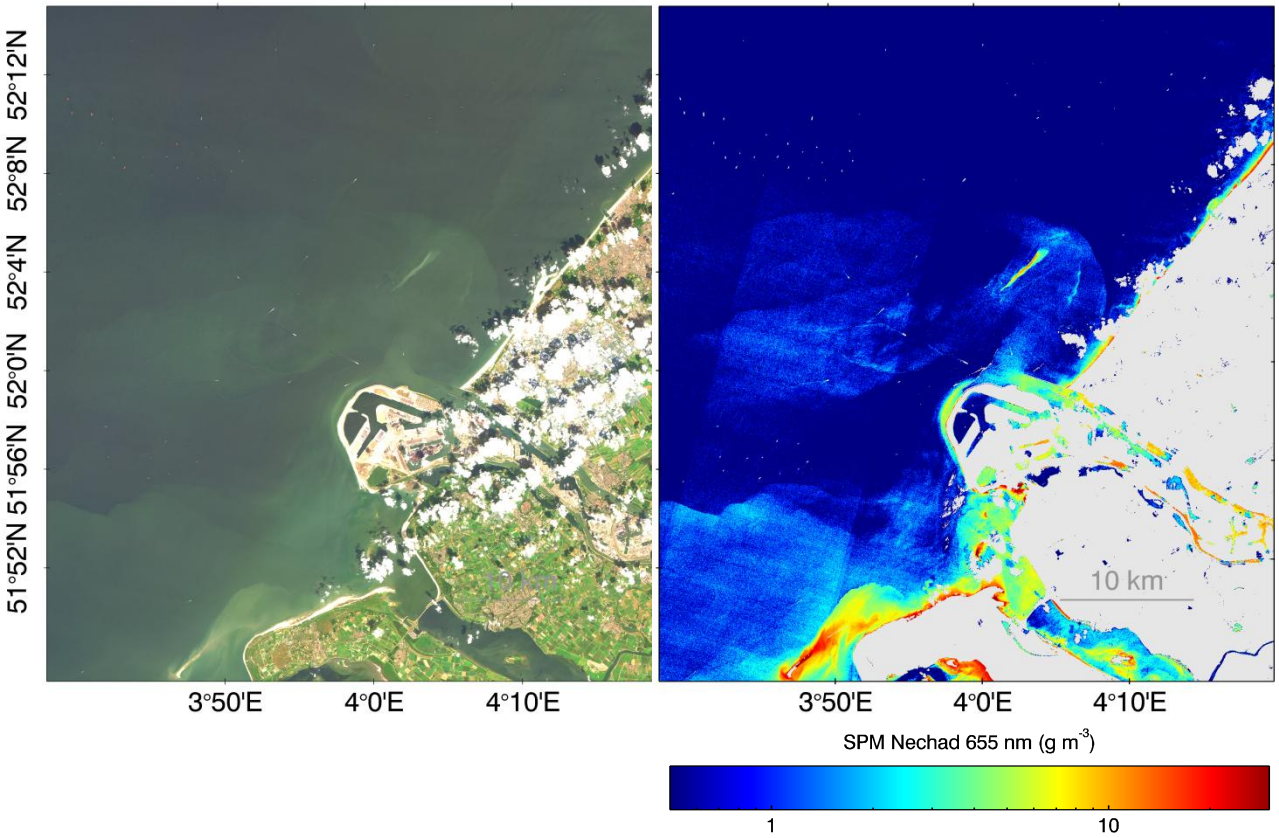


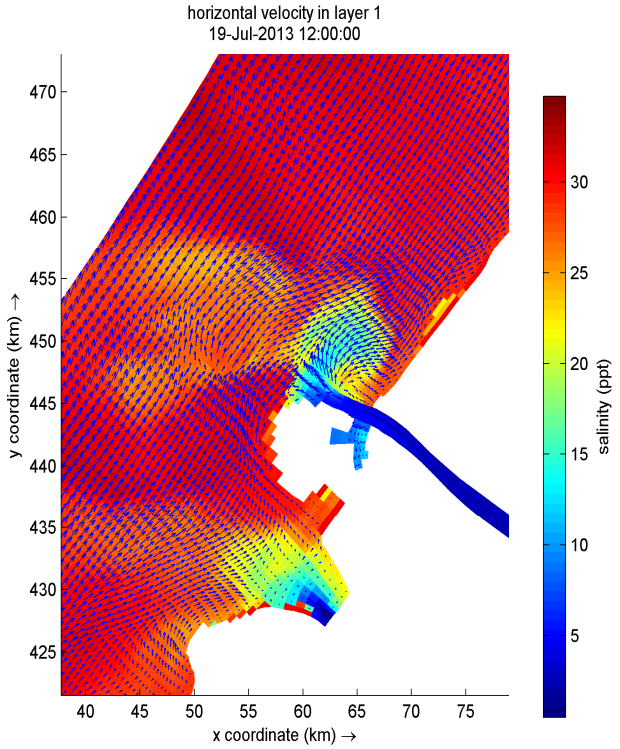


Deltares

Rijn-Maas rivier monding





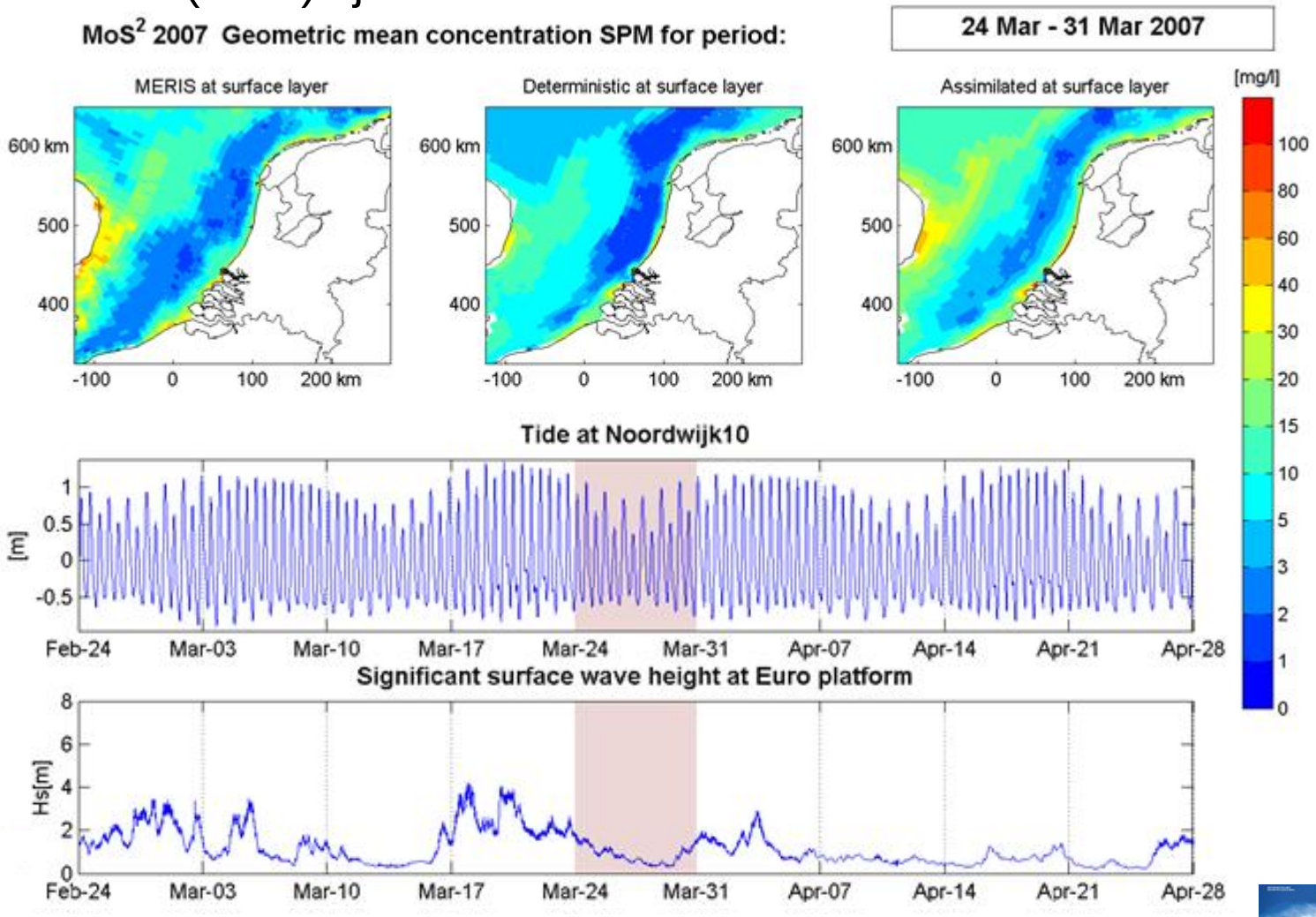


L8 OLI processed with ACOLITE by Marieke Eleveld, Delft-3D Flow by Thijs van Kessel Feb 2017

Deltares

Assimilatie van SPM in Delft-3D

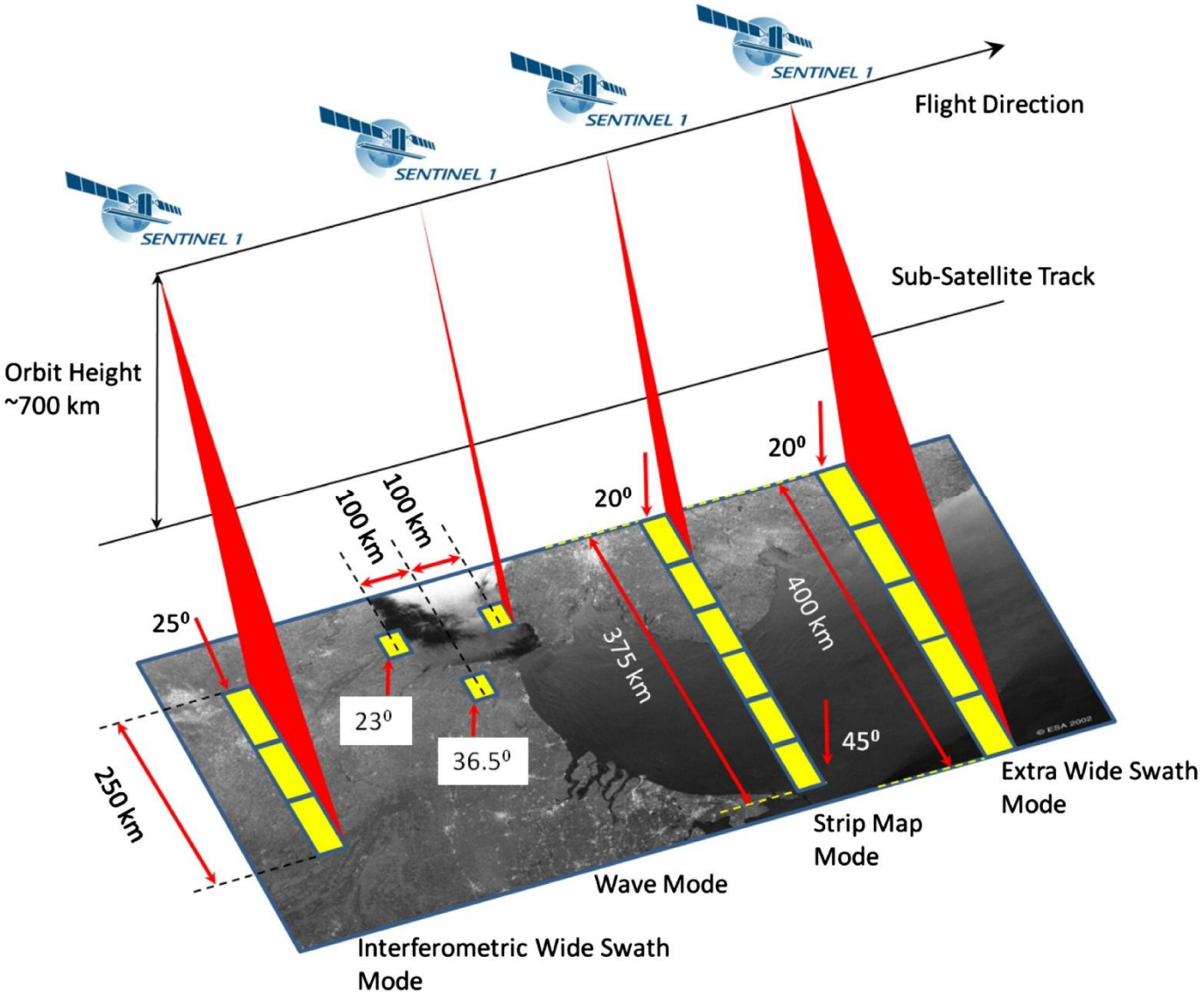
- Zwevend stof (SPM) tijdens verschillende condities



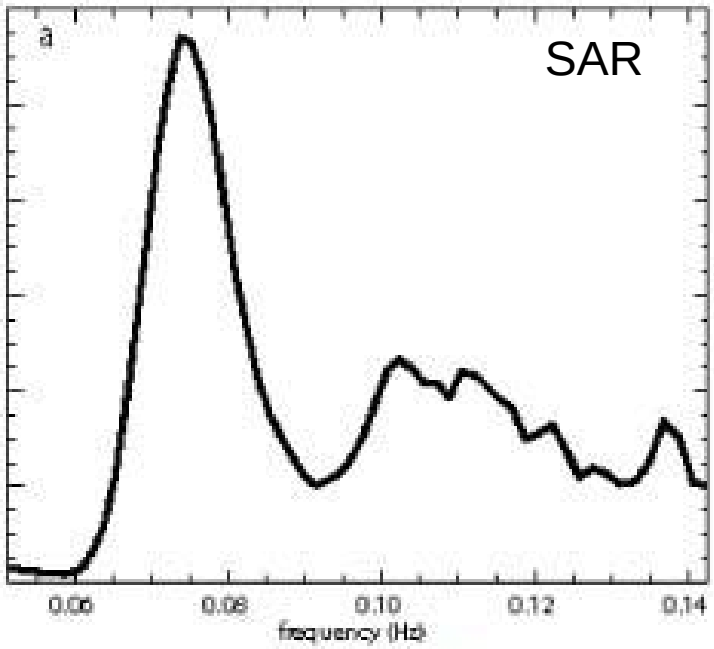
Blaas, Cronin, El Serafy, Eleveld et al., 2011, Deltares rept.

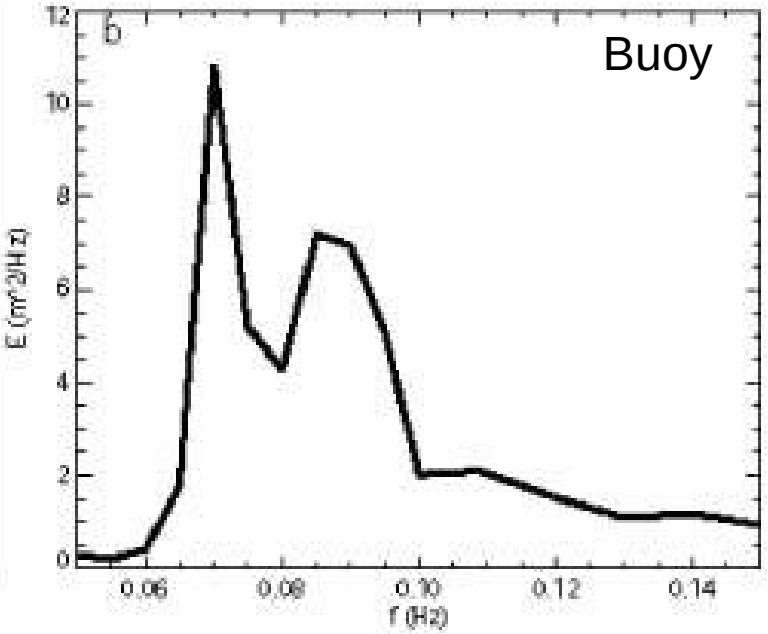
El Serafy, Eleveld, Blaas, et al., 2011

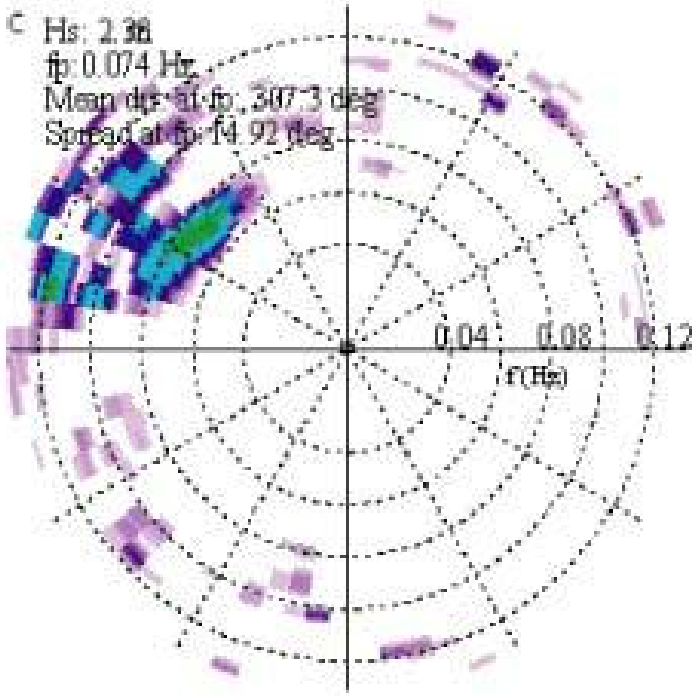
Sentinel-1: wave mode construeren

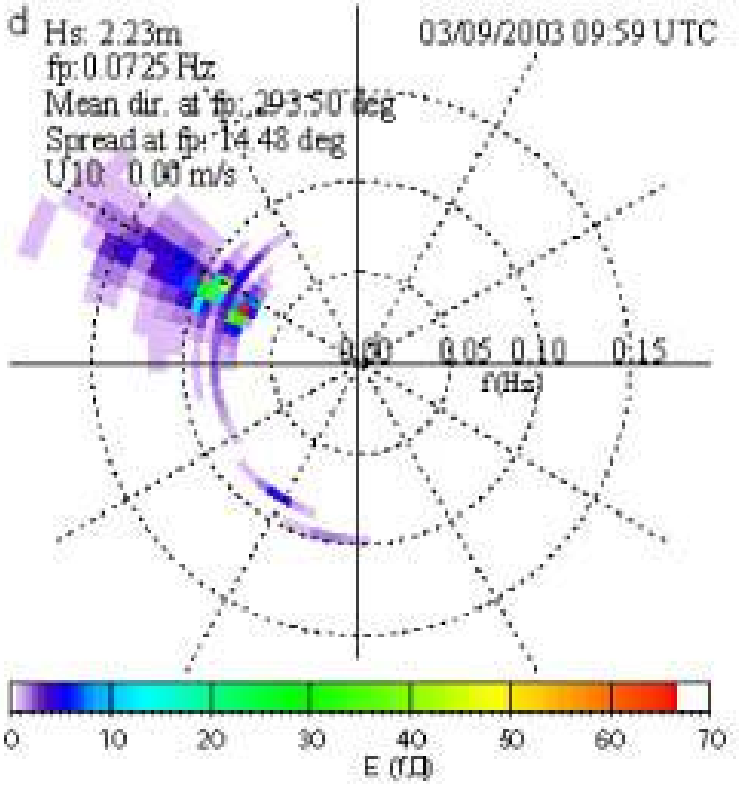


https://sentinel.esa.int/web/sentinel/missions/sentinel-1/instrument-payload/





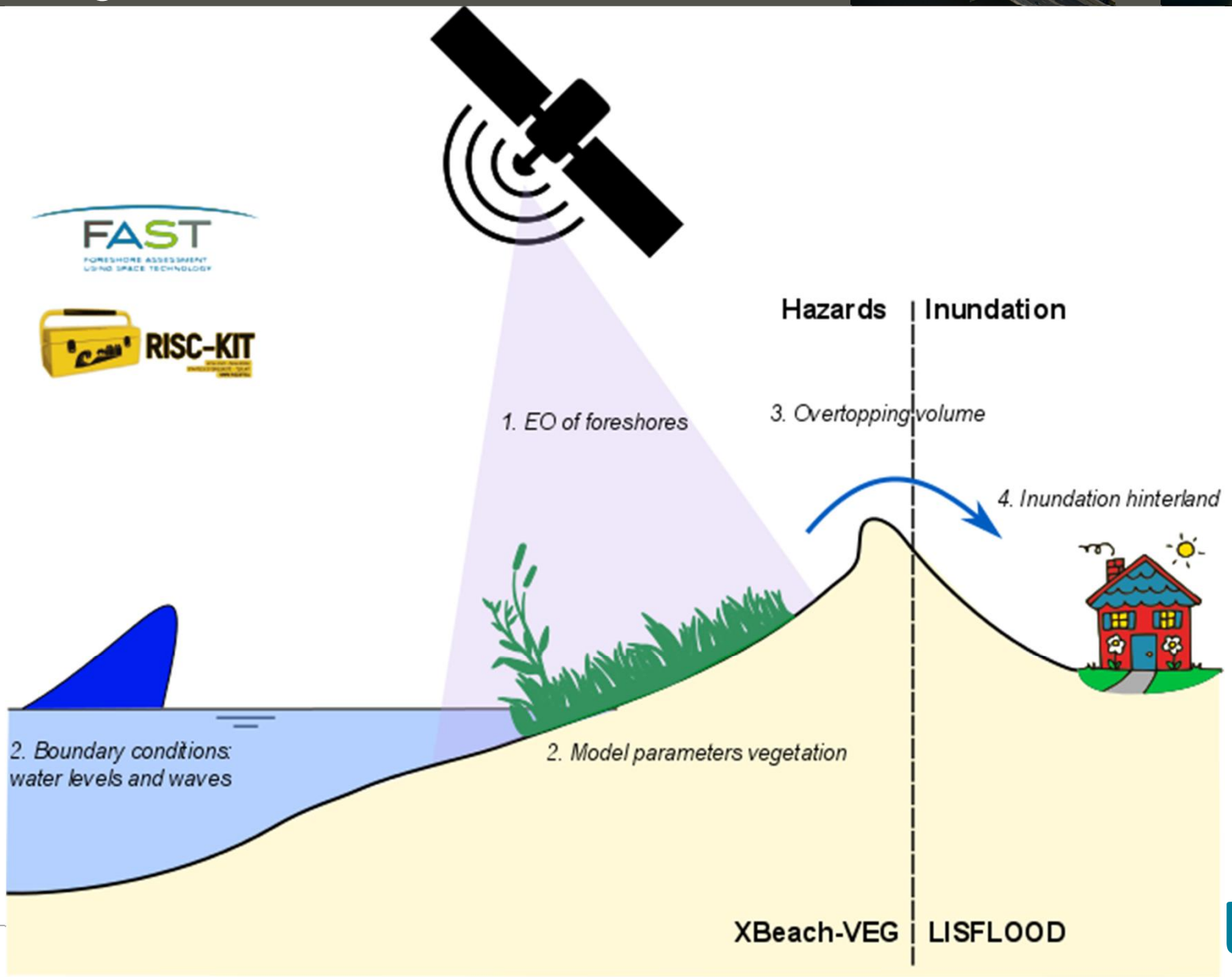




Collard et al., 2005. IEEE J Oc. Eng.

eltares

Waarom? Implications for SWAN, X-Beach, overtopping and impact modelIng



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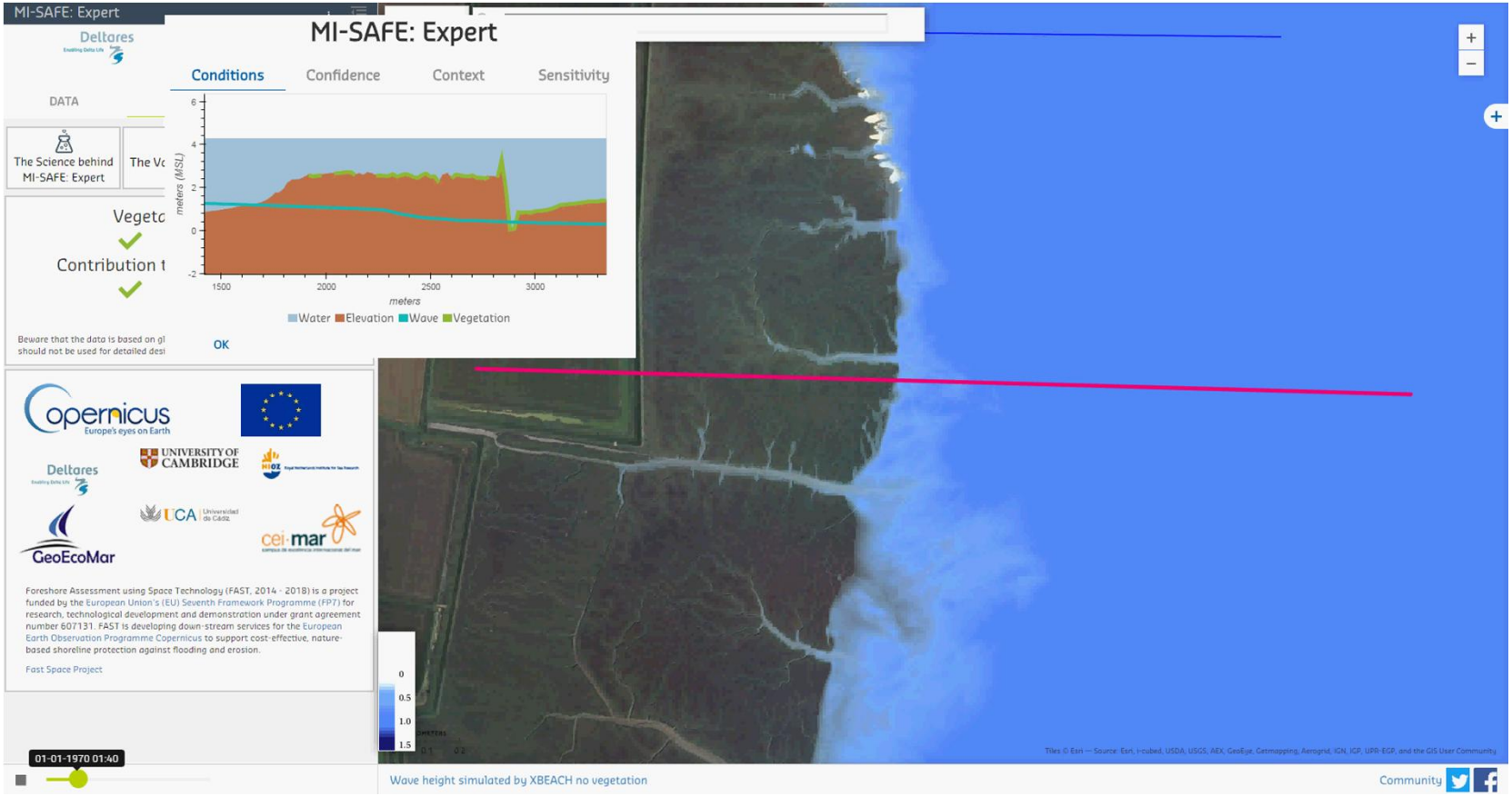
FAST Foreshore assessment using space technology

Nature based flood defence



Validation – good pre- and post field data needed!

http://fast.openearth.eu/expert/

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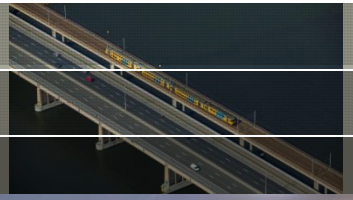
Waar we naar streven



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Thanks
OSTM/Jason 2
Jason
QuikSCAT
ACRIMSAT
EO-1
Aqua
SORCE
TRMM
Terra
GRACE
CALIPSO
CloudSat