ECMWF

Annual Seminar 2018

Earth System Assimilation

10 – 13 September

Organisation

Scientific programme: **Stephen English, Massimo Bonavita, Niels Bormann, Rossana Dragani, Johannes Flemming, Hans Hersbach, Elias Holm, Lars Isaksen, Sebastien Massart, Patricia Rosnay, Hao Zuo**

Organisation: **Karen Clarke, Simon Witter and others in ECMWF Comms team**

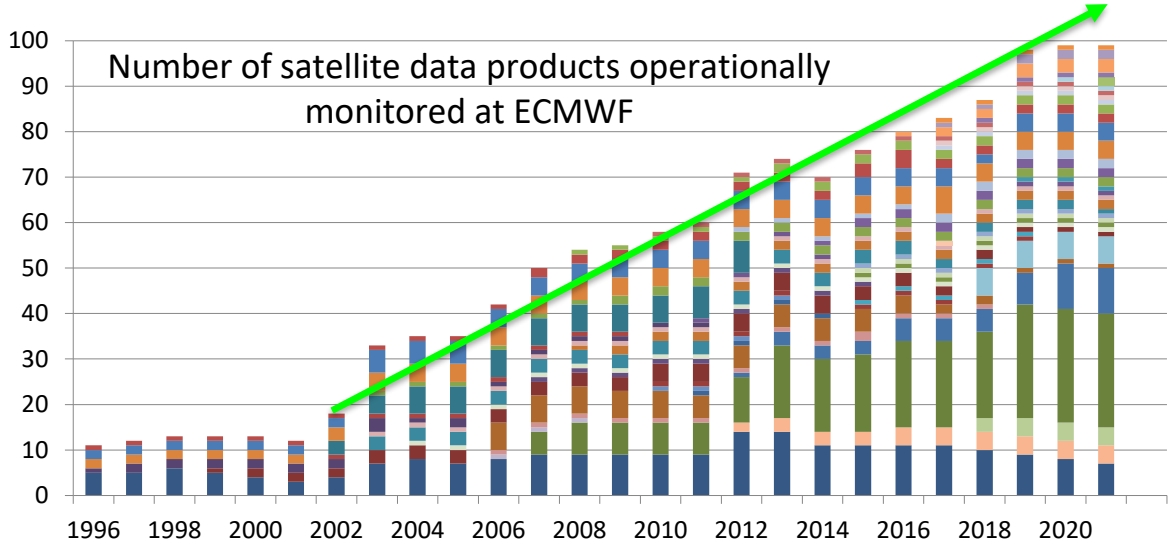
Special thanks to all speakers and session chairs

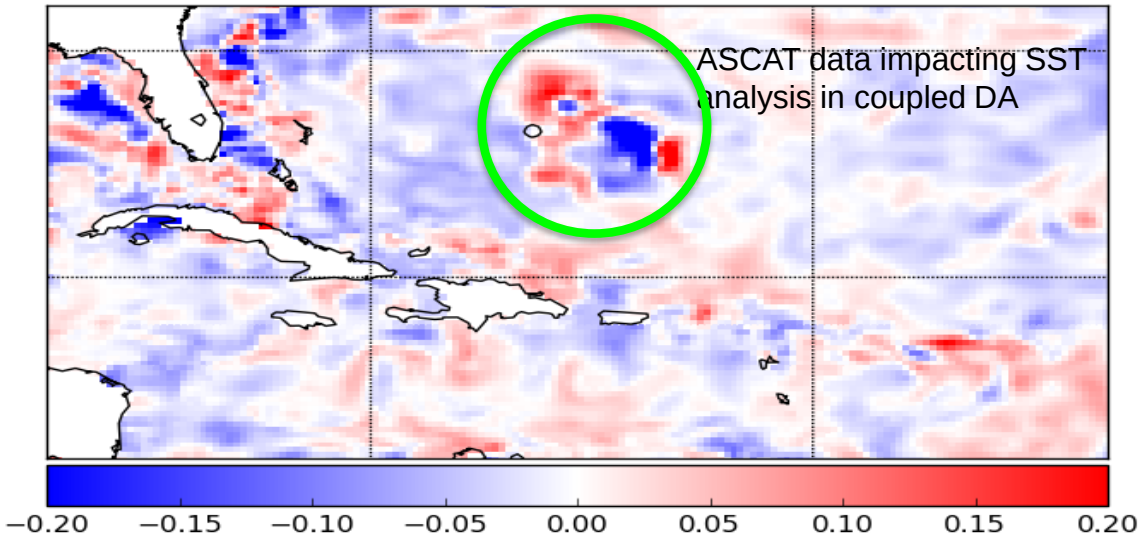
And to all of you for coming!

Seminar topics

Goal: To report and identify common themes in assimilation for different Earth system components (atmosphere, including composition; land; ocean; and cryosphere) with a particular emphasis on coupling. The Seminar will also present the status and evolution of the global observing system for Earth system assimilation.

- Day 1: Introduction to earth system data assimilation
- Day 2: Challenges in data assimilation
- Day 3: Coupling methods in numerical weather prediction
- Day 4: Status of and outlook for operational earth system assimilation





Day 1: Introduction to Earth System Data Assimilation

- **Andy Brown** Introduction

Welcome and strategic directions

- **Mark Buehner** Methods

An overview of the need for, and potential benefits from, coupled Earth system data assimilation.

- **John Eyre** Observations

The WMO Vision 2025 and progress and plans of space agencies towards implementation.

- **Patricia de Rosnay** Coupling

An overview of coupled assimilation activities across the ECMWF operational systems.

Day 2: Challenges in Data Assimilation

In this session speakers will illustrate challenges in Data Assimilation

- **Massimo Bonavita** Non-linearity and non-Gaussianity in variational methods

How important are non-linearity and non-Gaussianity in NWP DA methods?

- **Roland Potthast** Ensemble and particle filter methods

Ensemble data assimilation (EDA) at DWD and tests of localized adaptive particle filter.

- **Anthony Weaver** Background error

State of the art research topics for background error, parallel properties and hybrid methods.

- **Chiara Piccolo** Model error

Testing and comparing DA estimation of model error with stochastic methods.

- **Sarah Dance** Observation error

Diagnosing and handling complex observation errors, including correlated error.

- **Marc Bocquet** Assimilation in data sparse cases

Methods to account for sparse observation networks applied to composition analysis.

Day 3: Coupling

- **Nils Wedi** Coupled Earth System models

Modelling advances to improve the description of variables at interfaces.

- **Saroja Polavarapu** Coupled Atmospheric composition models

The carbon cycle shows the unique challenges associated with atmospheric chemistry models.

- **Marta Janisková** Linear Model and Adjoint methods

Current value of and future development of the adjoint approach.

- **Sergey Frolov** Overview of Data Assimilation coupling methods

To include weakly coupled, outer loop-coupled, interface coupled, and strongly coupled methods.

- **Alan Geer** Observation operator coupling

Existing atmospheric radiance assimilation could help infer surface properties directly.

- **Dinand Schepers** Outer-loop coupling and coupled re-analysis

The CERA-SAT coupled reanalysis and the benefits of coupled data assimilation.

Day 2: Status and outlook

- **Antje Inness** Assimilation for atmospheric composition

Highlight some of the special challenges faced when assimilating atmospheric composition data

- **Phil Browne** Assimilation for ocean

Ocean assimilation method and configuration, and current observation network, and coupling

- **Clara Draper** Assimilation for land

The design of land DA systems and coupled land/atmosphere DA experiments.

- **Jean-François Mahfouf** Towards operational Earth System Assimilation

Earth System DA for limited area modelling and short-range forecasting at Météo-France

- **Andy Brown** Closure of seminar