THE ANALOG DATA ASSIMILATION: APPLICATION TO 20 YEARS OF ALTIMETRIC DATA

Tandeo et al.

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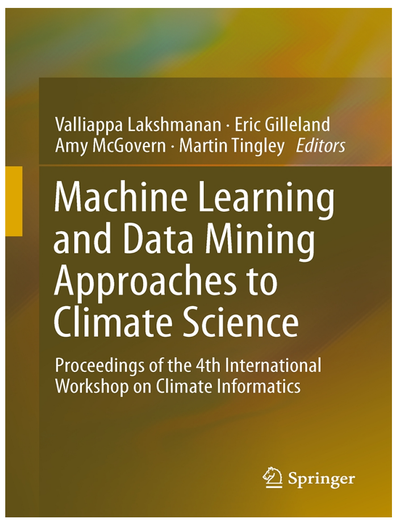
References



Chapter 1:

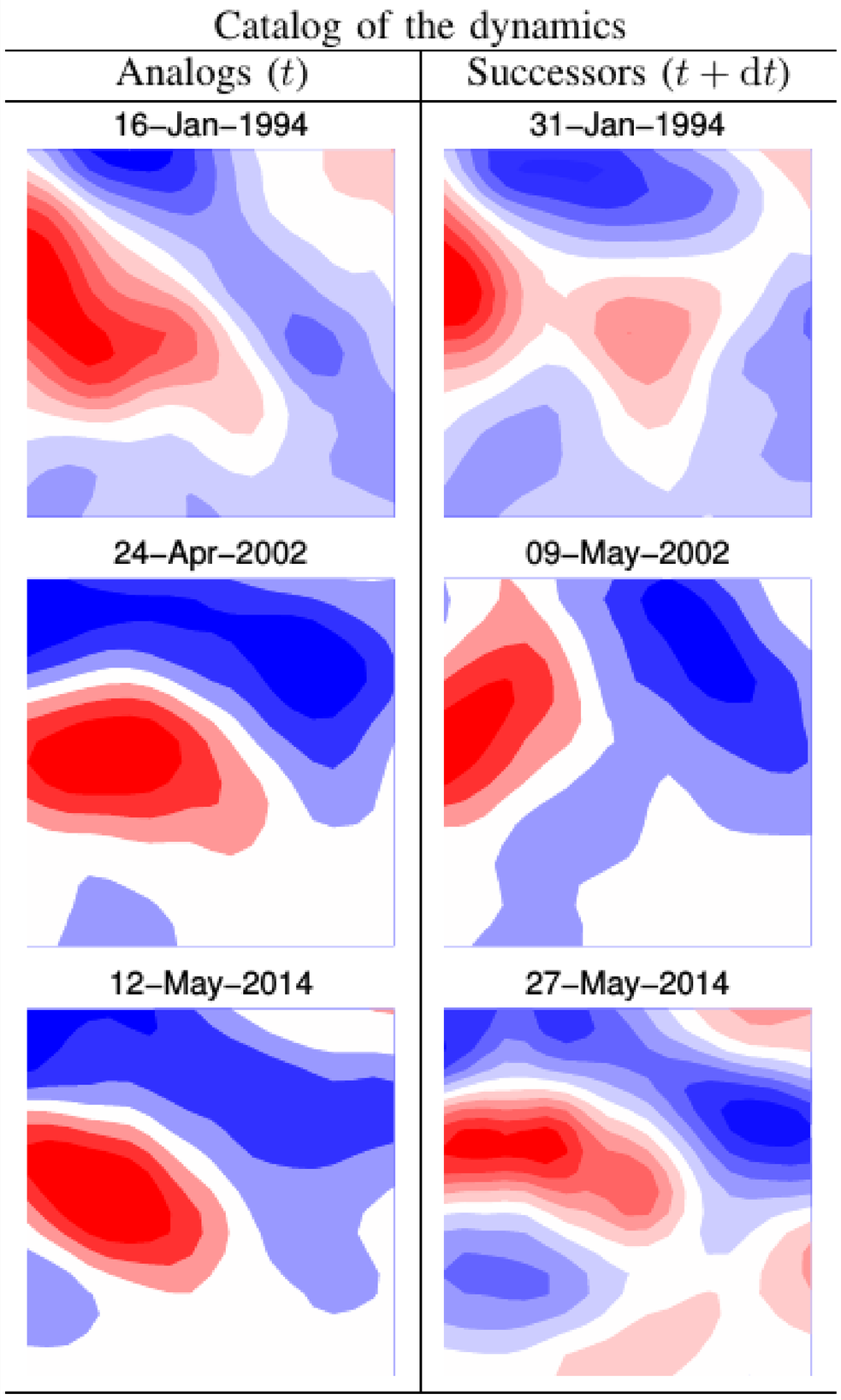
Tandeo et al. 2015

Combining analog method and ensemble data assimilation: Application to the Lorenz-63 chaotic system

Abstract

The **reconstruction of geophysical dynamics** remains a key challenge in ocean, atmosphere and climate sciences. **Data assimilation** methods are the state-of-the-art techniques to reconstruct the space-time dynamics from **noisy and partial observations**. They typically involve multiple runs of an explicit **dynamical model** and may have **severe operational limitations**. Here, we demonstrate how large amount of **historical satellite data** can open new avenues to address data assimilation issues, and to develop a fully **data-driven assimilation**.

Data



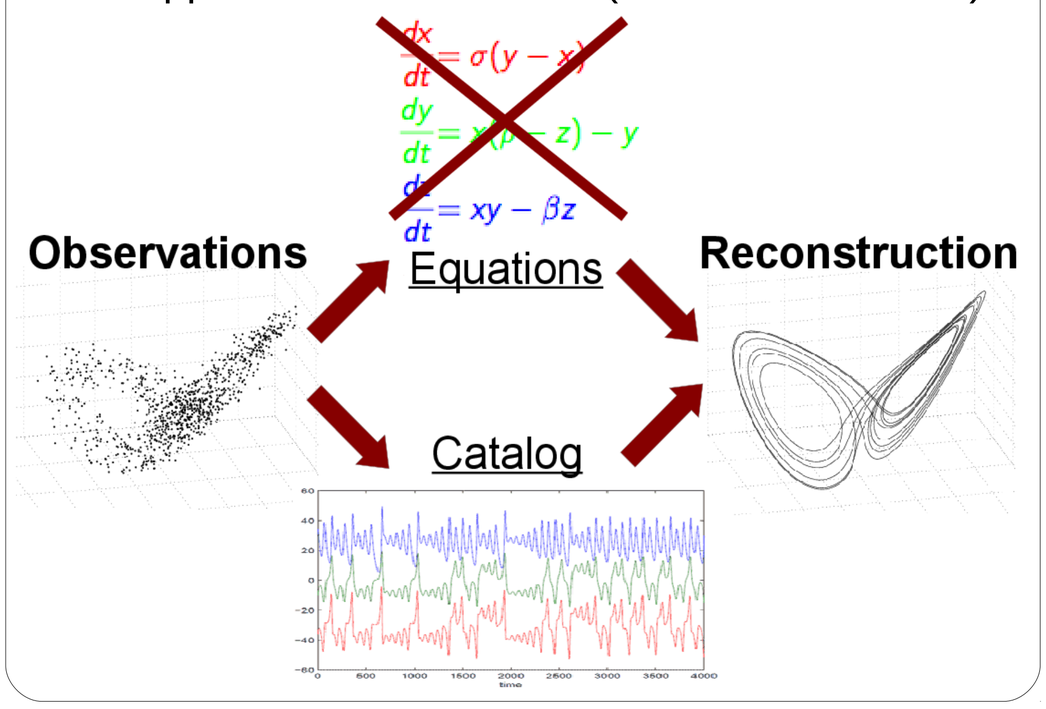
The **sea surface height** and the associated geostrophic **surface currents** are key ocean variables observed from space for **20 years** by **altimeter satellites**. In this work, the idea is to use the **repeatability** of the **allready observed events** in order to reconstruct the spatiotemporal evolution of **mesoscale eddies**. As an example, we plot a sample **catalog** of **analogs** (at a given **time t**) and **successors** (at **time t+dt**) of interpolated along track altimetric data in the **Agulhas return current**.

Method

We combine **analog method** and **ensemble filters**:

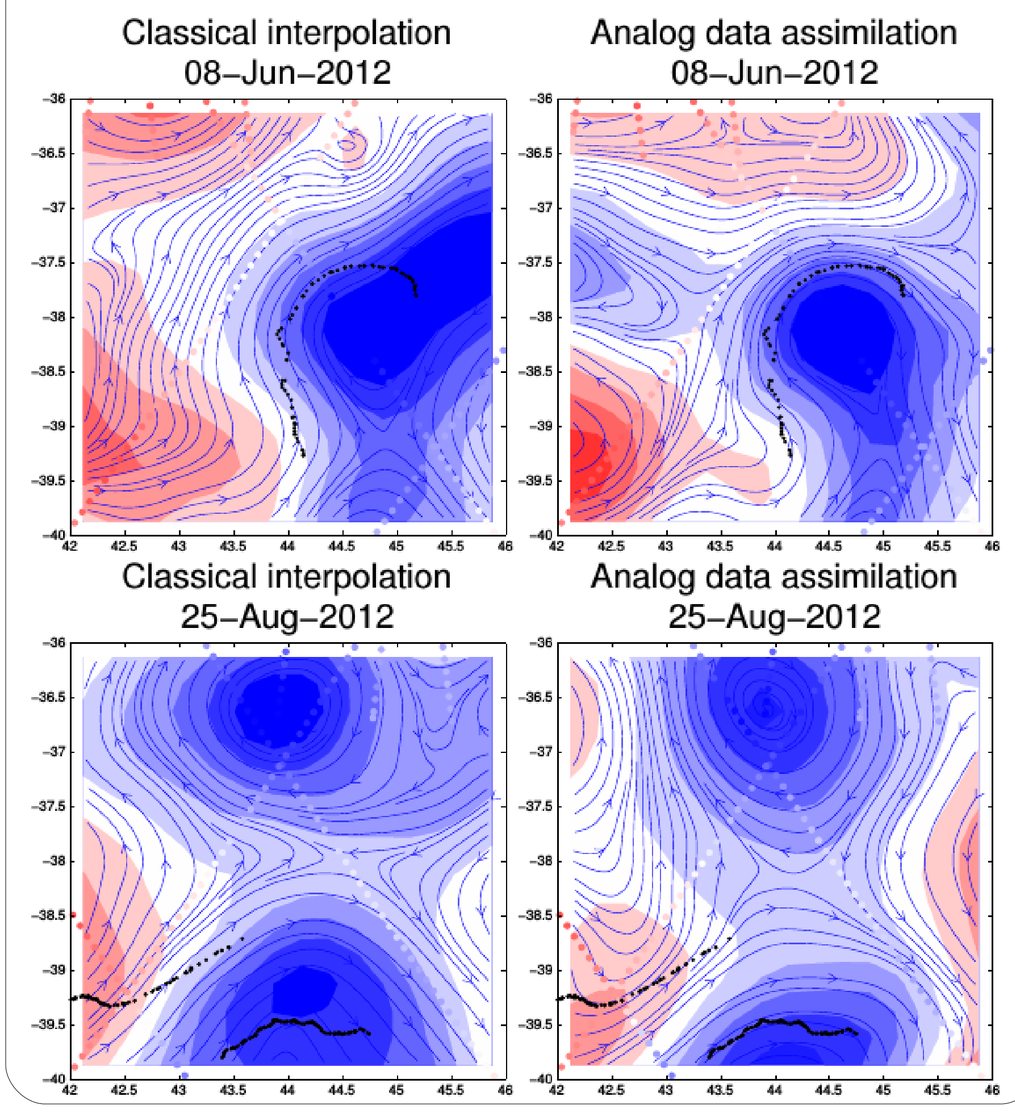
→ Analog Ensemble Kalman Filter & Smoother

→ application to Lorenz-63 (*Tandeo et al. 2015*)



Results

The results indicate better agreement between **drifting buoys** (black dots) and **analog data assimilation** (compared to classical interpolation).



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