



## **Multi resolution variational data assimilation system for the ocean**

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The convergence of variational data assimilation algorithm for high dimensional non-linear system is an important issue. In this presentation we will focus on two multi scale approaches for solving the 4D variational data assimilation problem, the truncated Gauss Newton (TGN) and the Multi scale Gauss Newton (MsGN) algorithms. Both requires the use of operators allowing to project system states from one resolution to another, which could be delicate for ocean applications due to complex boundaries

These algorithms are part of recent developments of the NEMOVAR system, which is a state-of-the-art variational data assimilation system for the NEMO European ocean community model. NEMOVAR is used in two major operational centres in its 3D-Fgat configuration.

The general NEMOVAR framework and the TGN and MsGN algorithms will be presented, they will be applied to realistic ocean configurations and their relative merits will be compared, and difficulties related to the specificities of the ocean will be discussed