EUREC4A-OA

Contribution from LOPS

EUREC4A-OA

People involved at LOPS:

X. Carton, J.-L. Redelsperger, J. Gula, P. Lhégaret, a postdoc to be hired, A. Vic (PhD - 2020-2023),

and students:

O. Lenoble, M1, April - August 2021, Interactions between near-inertial waves and mesoscale eddies during the EU- REC4a campaign.
L. Eisenring, M2, April - August 2021, Submesoscale coherent vortices in the Northwestern Atlantic
G. Zerbini, M2, April - August 2021, Ocean-atmosphere interaction above fronts and eddies during Eurec4a.
M. Menard, M2, April - August 2021, Dynamics of river plumes and their interactions with vortices in the Northwestern Atlantic Ocean.

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Task 1.3 Quantifying the ocean heat and momentum uptake at the ocean small scale

The goal is to identify and investigate **mechanisms associated with small scale ocean structures** and their impact on horizontal and vertical fluxes of momentum, heat, and tracers.

We will use observational data and numerical simulations to investigate

- the **dynamics of eddies** (stability and interactions) under atmospheric forcing modified by the ocean mesoscale activity,
- the **effect of eddies on heat and momentum uptake,** on their horizontal and vertical transport,
- the **effect of sub-mesoscale fronts and instabilities** (the intense vertical flows in frontal structures versus the re-stratification by mixing layer instabilities)
- the **effect of rivers** through the generation of fronts and changes in the properties of the mixed-layer.

Existing Simulations

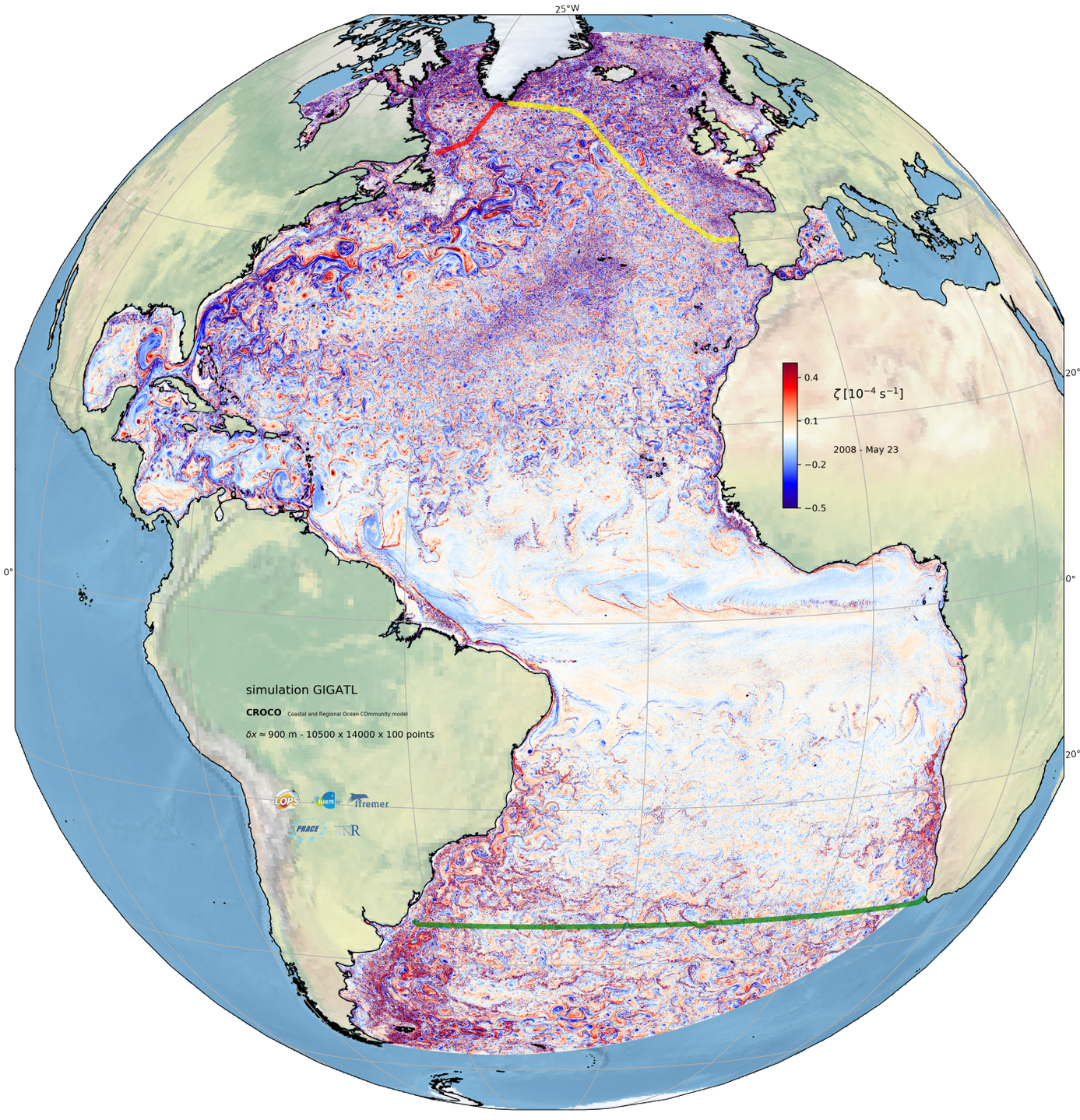
Hierarchy of Fully realistic simulations of the Atlantic Ocean with the terrain-following model CROCO

Including **tides,**
hourly atmospheric forcings
and **river outflows**

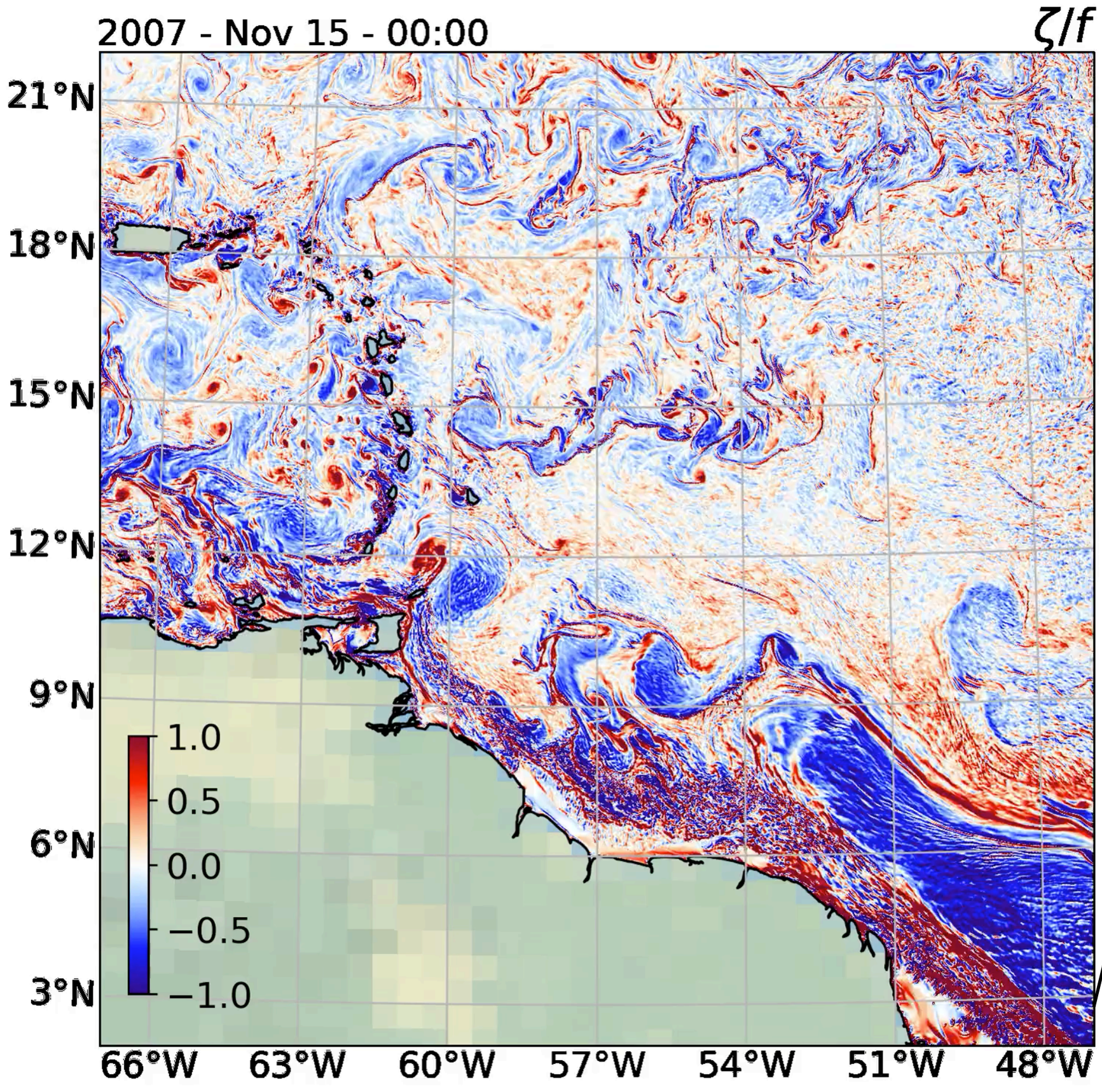
Horizontal resolutions 6 km / 3 km and **1 km** with 100 topography following levels (refined at the bottom)

= 10500 x 14000 x 100 points

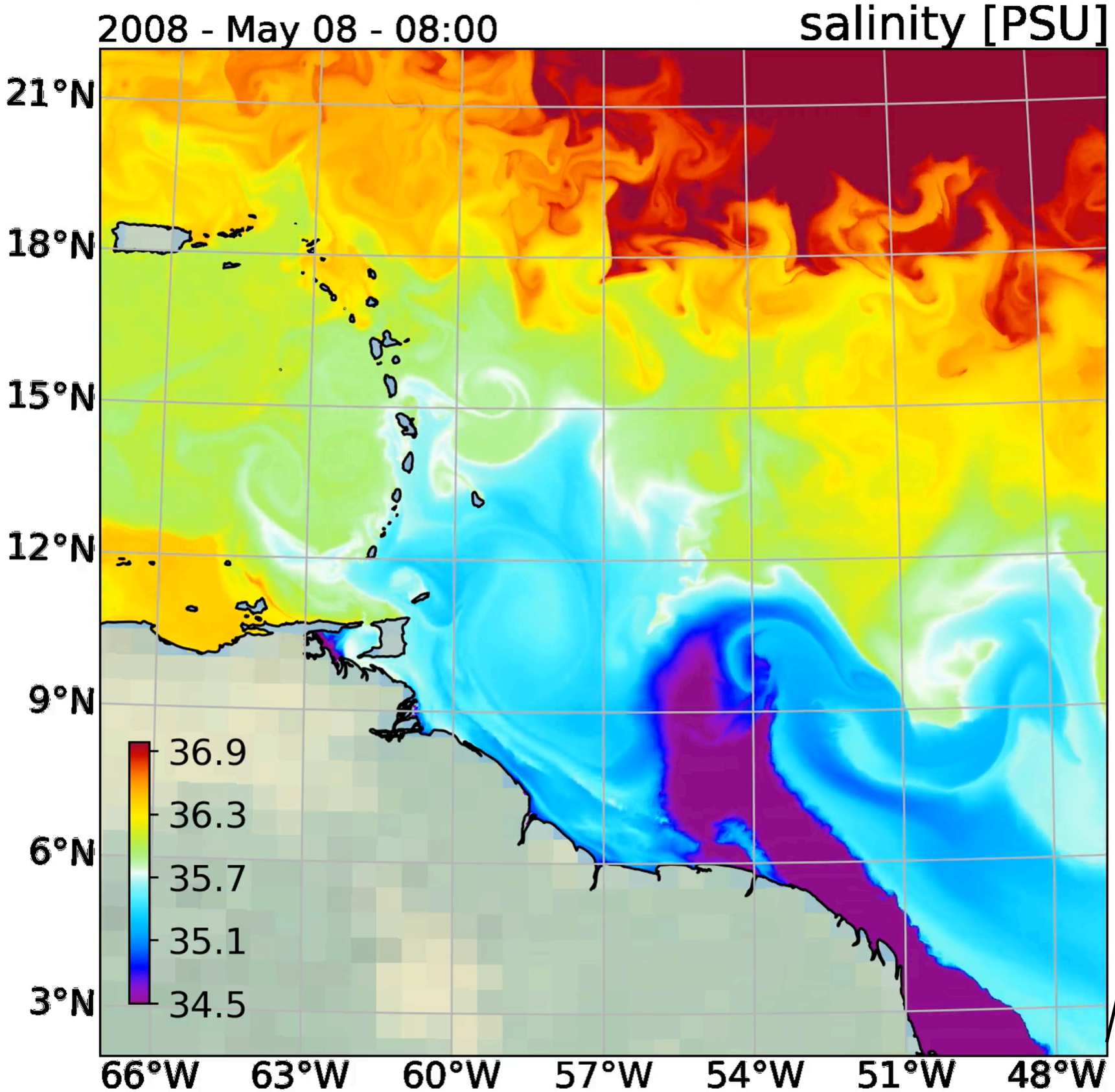
Simulation GIGATL

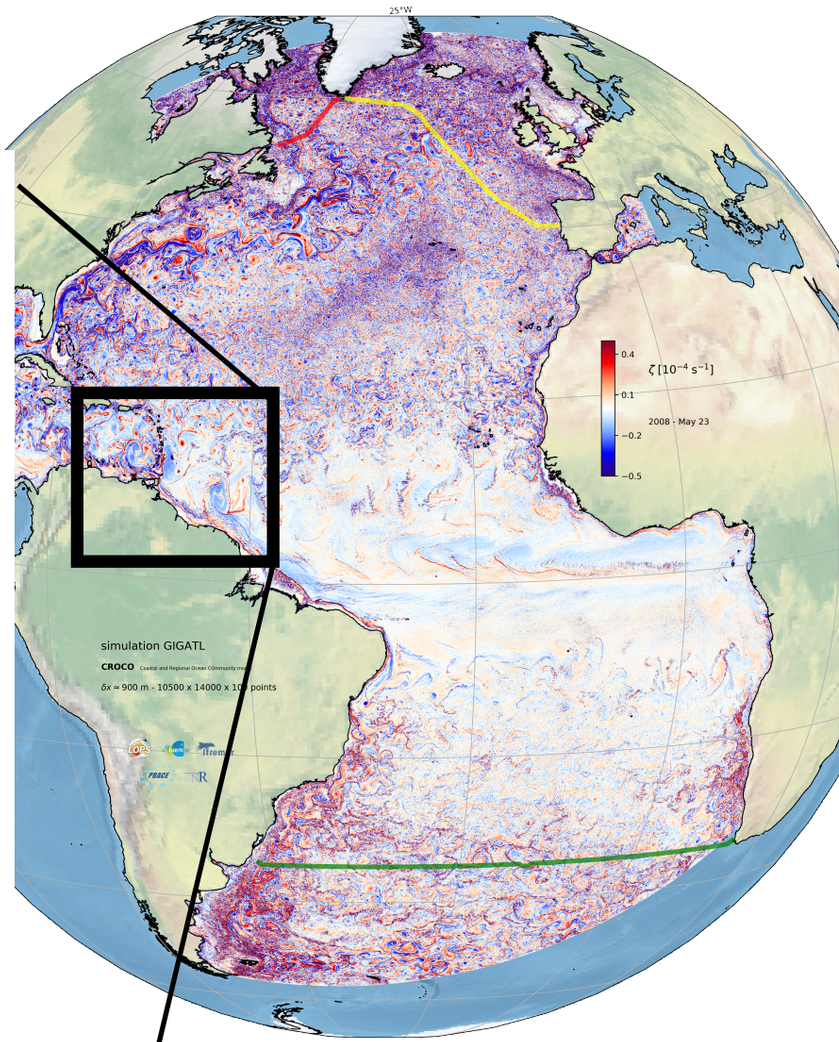


EUREC4A-OA region



EUREC4A-OA region





Next step

Regional nests with CROCO (ocean-only)

using GIGATL1 boundary conditions.

Including **tides (TPXO), hourly atmospheric forcings (CFSR)** and **river outflows.**

dx = 300 m, 200 levels
dx = 100 m, 300 levels