



# Ongoing applications of ELCIRC at LNEC: Iberian continental shelf and Aveiro lagoon

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# Outline

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- Baroclinic tides in the Iberian Atlantic continental shelf
- Tidal flow and morphodynamics in the Aveiro lagoon



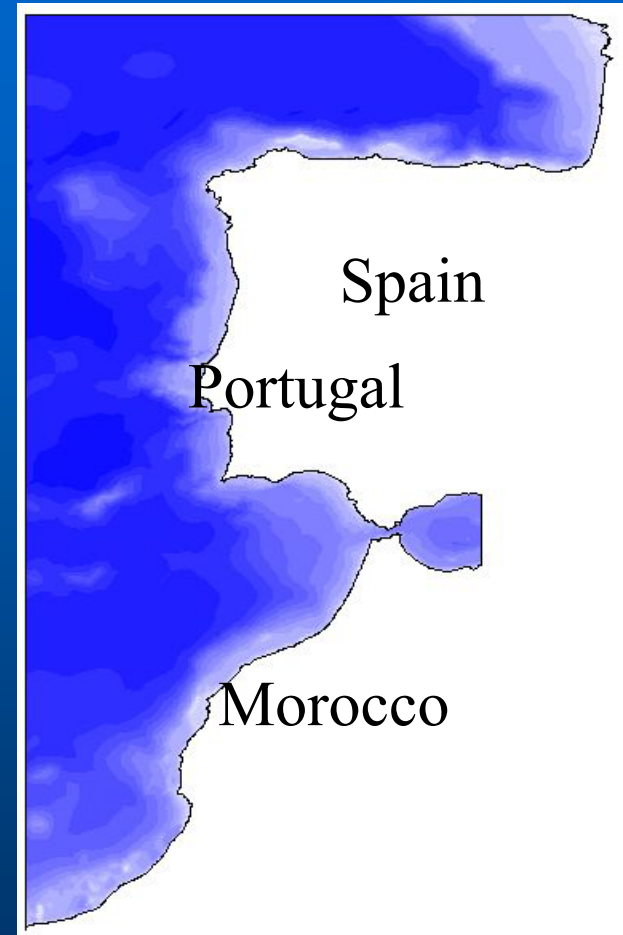
# Baroclinic tides in the Iberian shelf

- **Goal:**

- Characterize seasonal circulation in the Portuguese continental shelf

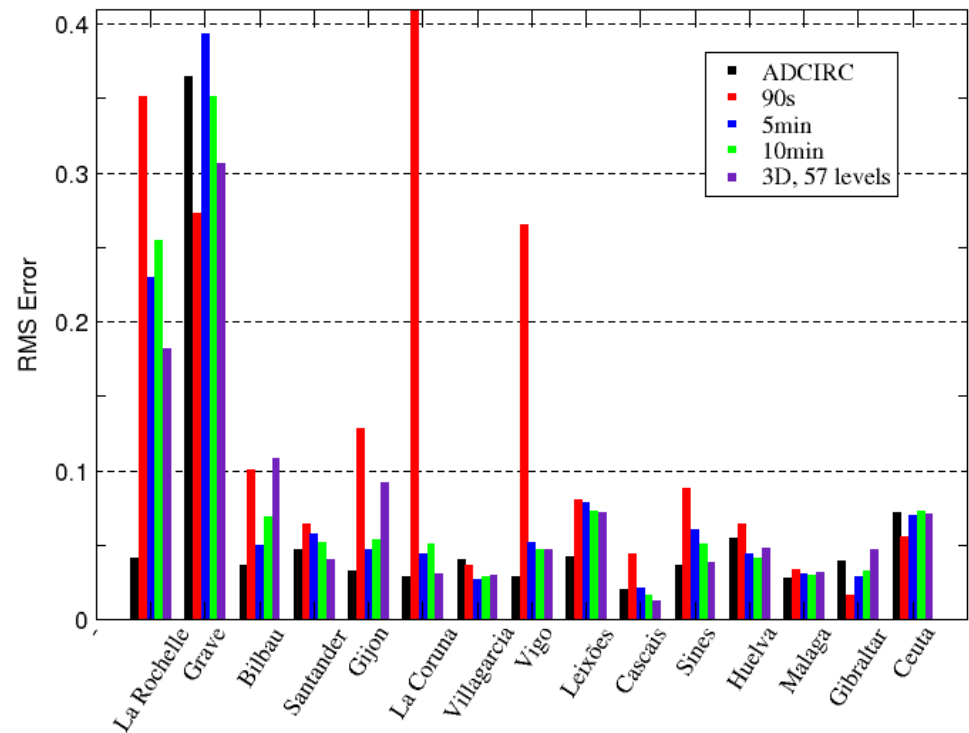
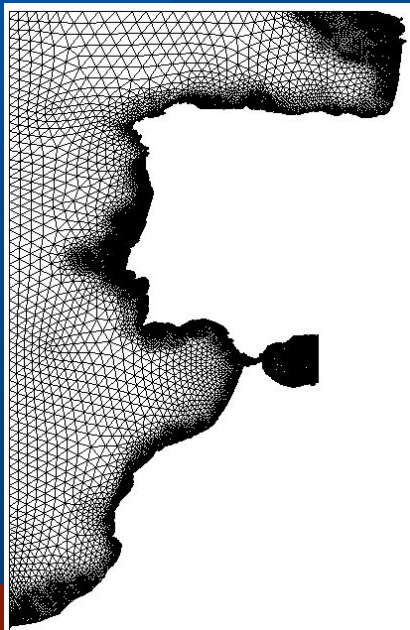
- **ELCIRC**

- Version 5.02g2
- Modifications for diagnostic baroclinic modeling and 3D S/T initial conditions
- ADCIRC's harmonic analysis included



# Comparison with data and ADCIRC

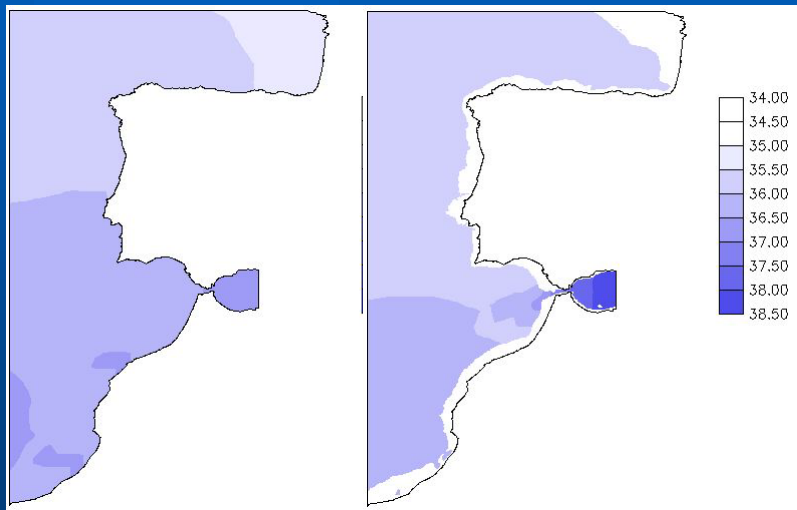
- Barotropic runs:
  - ADCIRC grid
  - 2D: Defining time step (5 minutes)
  - 3D – 57 levels



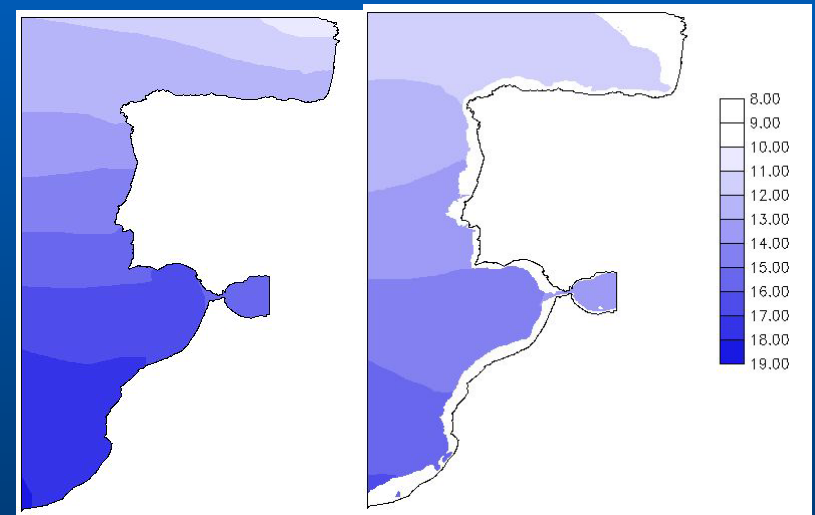
# 3D diagnostic baroclinic model: setup

- Winter IC and BCs from Levitus database: 3D Salt/Temp IC

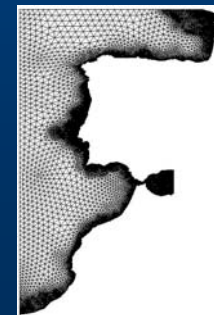
Salinity IC: 0 and 200 m



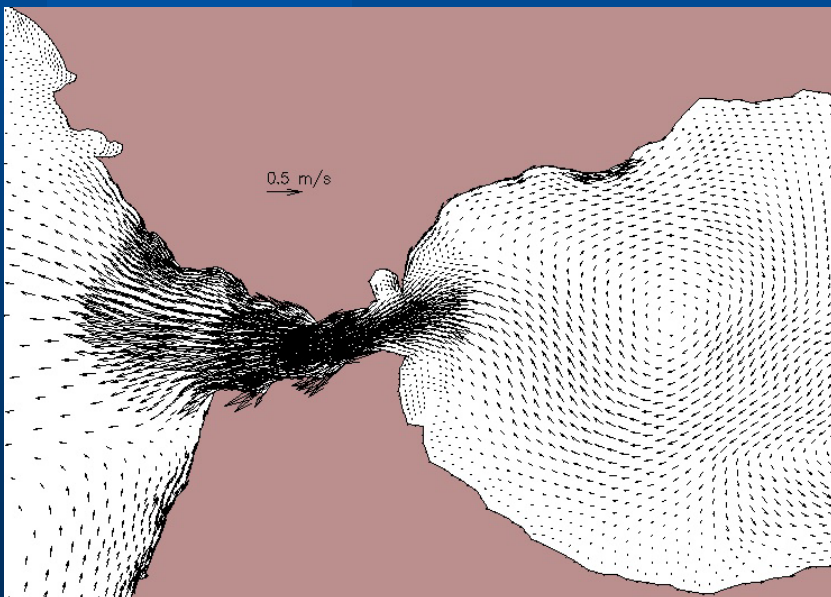
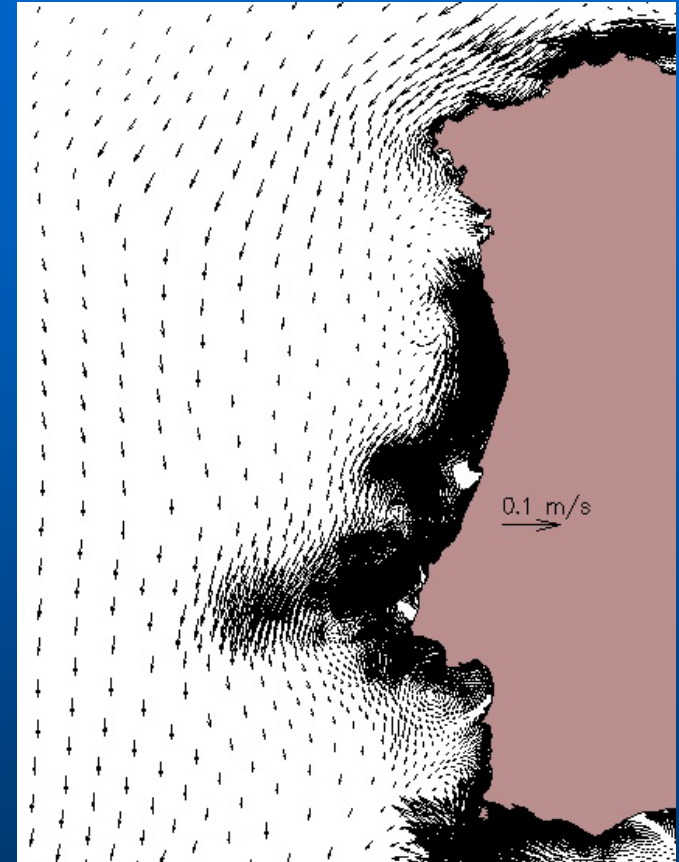
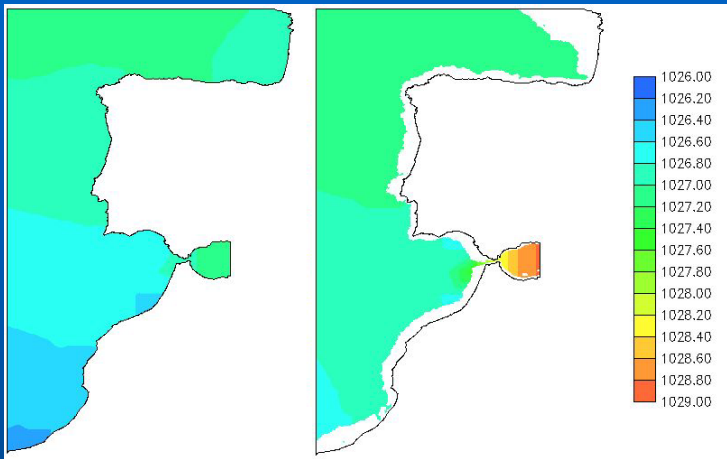
Temperature IC: 0 and 200 m



- Comparison with barotropic simulation



# 3D diagnostic baroclinic model: general behavior



## ONGOING TASKS...

- Revisit the grid
- Test effect of turbulence closure, time step...
- Validate with velocity data
- Simulate other seasonal conditions

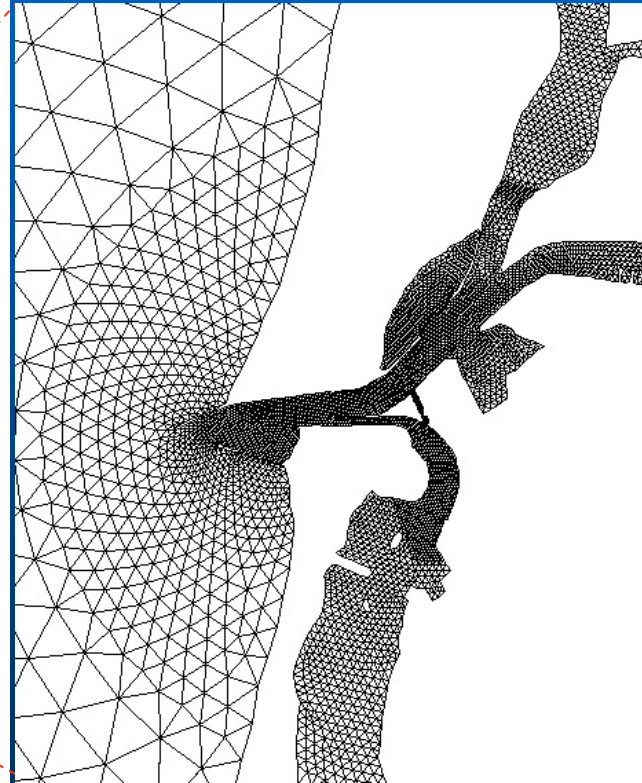
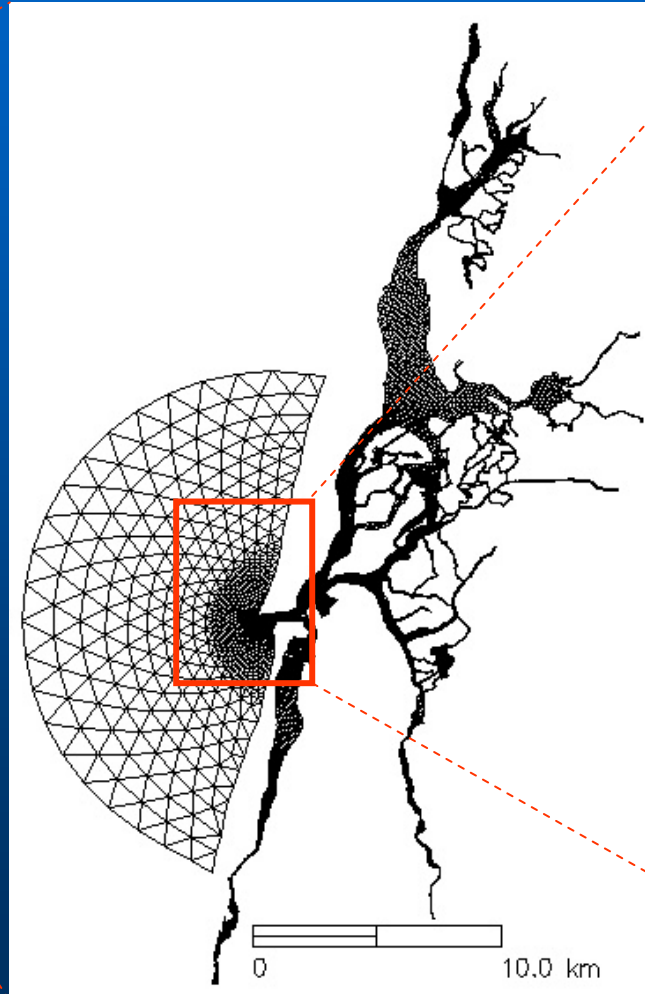
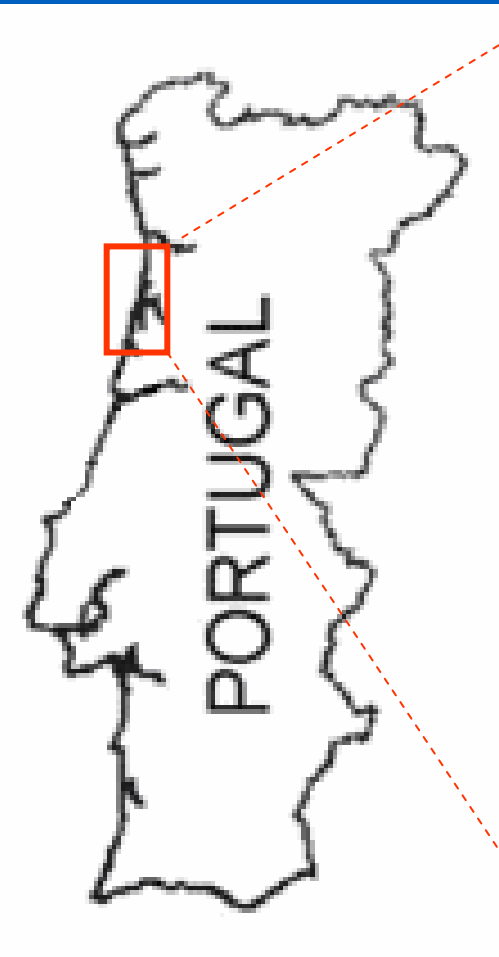


# Barotropic tides in the Aveiro lagoon

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- **Project objective: model and understand the morphodynamic evolution of the Aveiro tidal inlet**
- **First steps:**
  - **Set-up tidal model for morphodynamic simulations**
  - **Characterize tidal propagation inside the Aveiro lagoon**

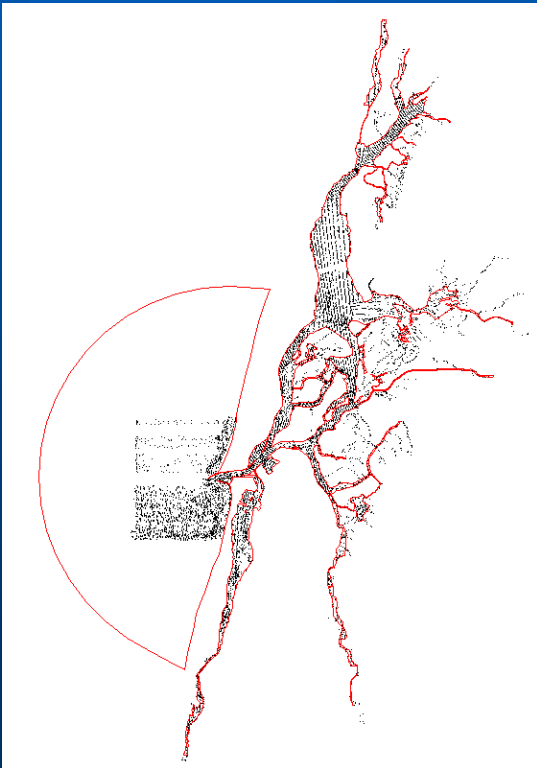
# Location and grid





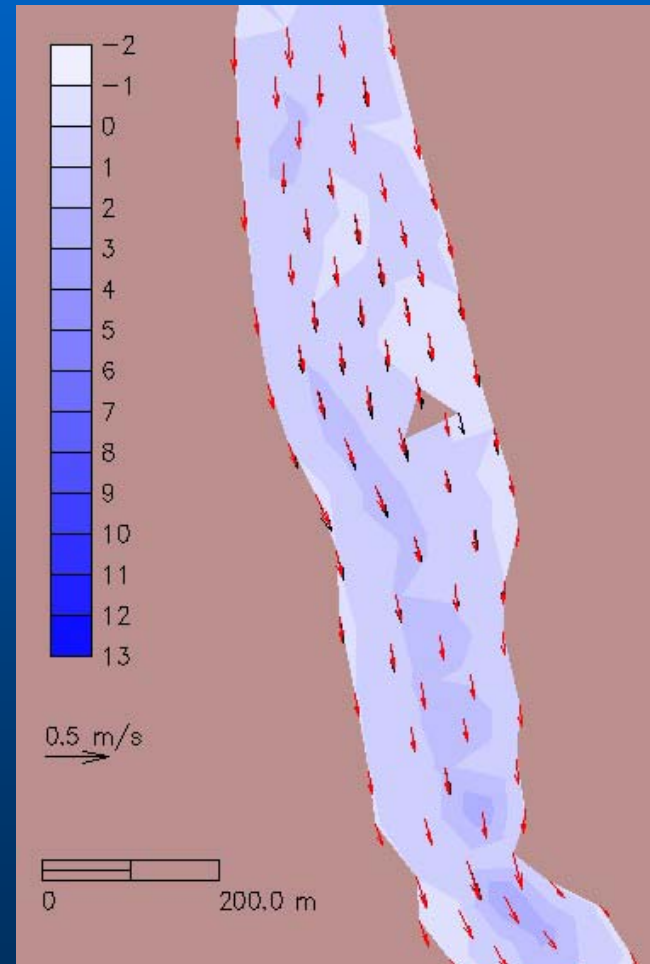
# Bathymetry

- Extensive tidal flats and salt marshes with poor bathymetric data



# Preliminary results

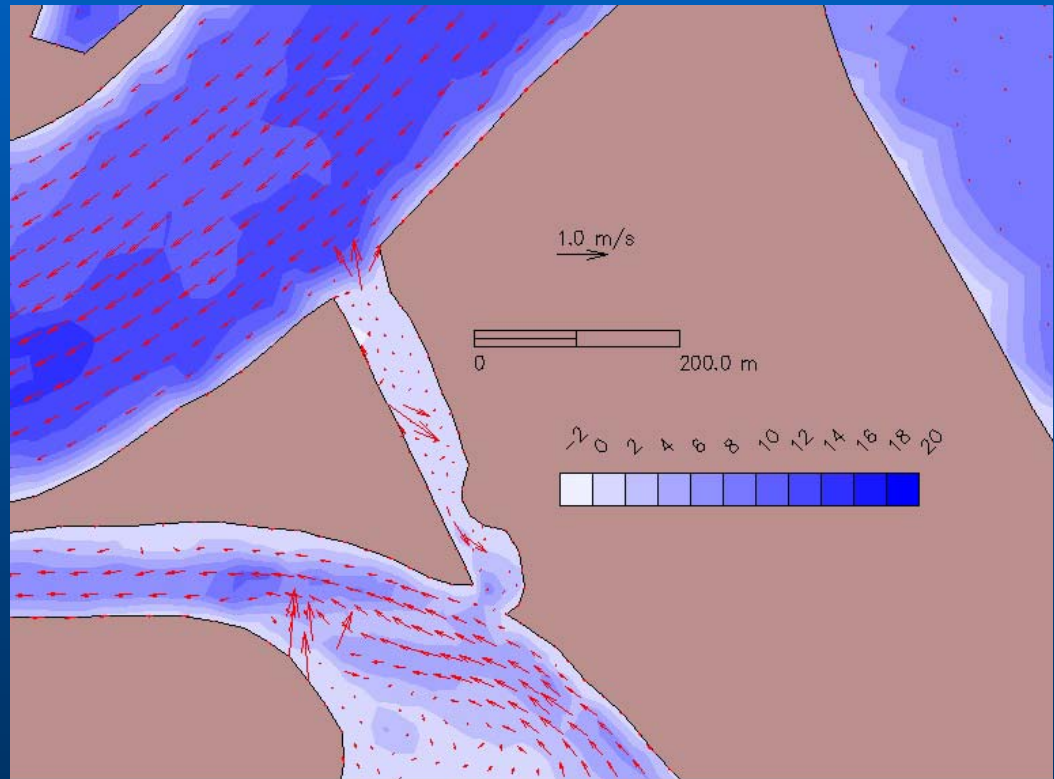
- Fine tuning the grid



# Preliminary results

## Occasional high velocities in shallow nodes:

consequences  
for sediment  
transport?



### ONGOING and FUTURE TASKS...

- Calibration and validation
- Coupling with wave model: radiation stresses and effect of currents on waves

# Future - SELFIE?

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- **Morphodynamic modeling of inlets under highly energetic events (storms, floods,...)**
  - Lúgia Pinto PhD thesis
- **Oil spills transport and fate near the coast and in estuaries**
  - Alberto Azevedo PhD thesis (?)

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