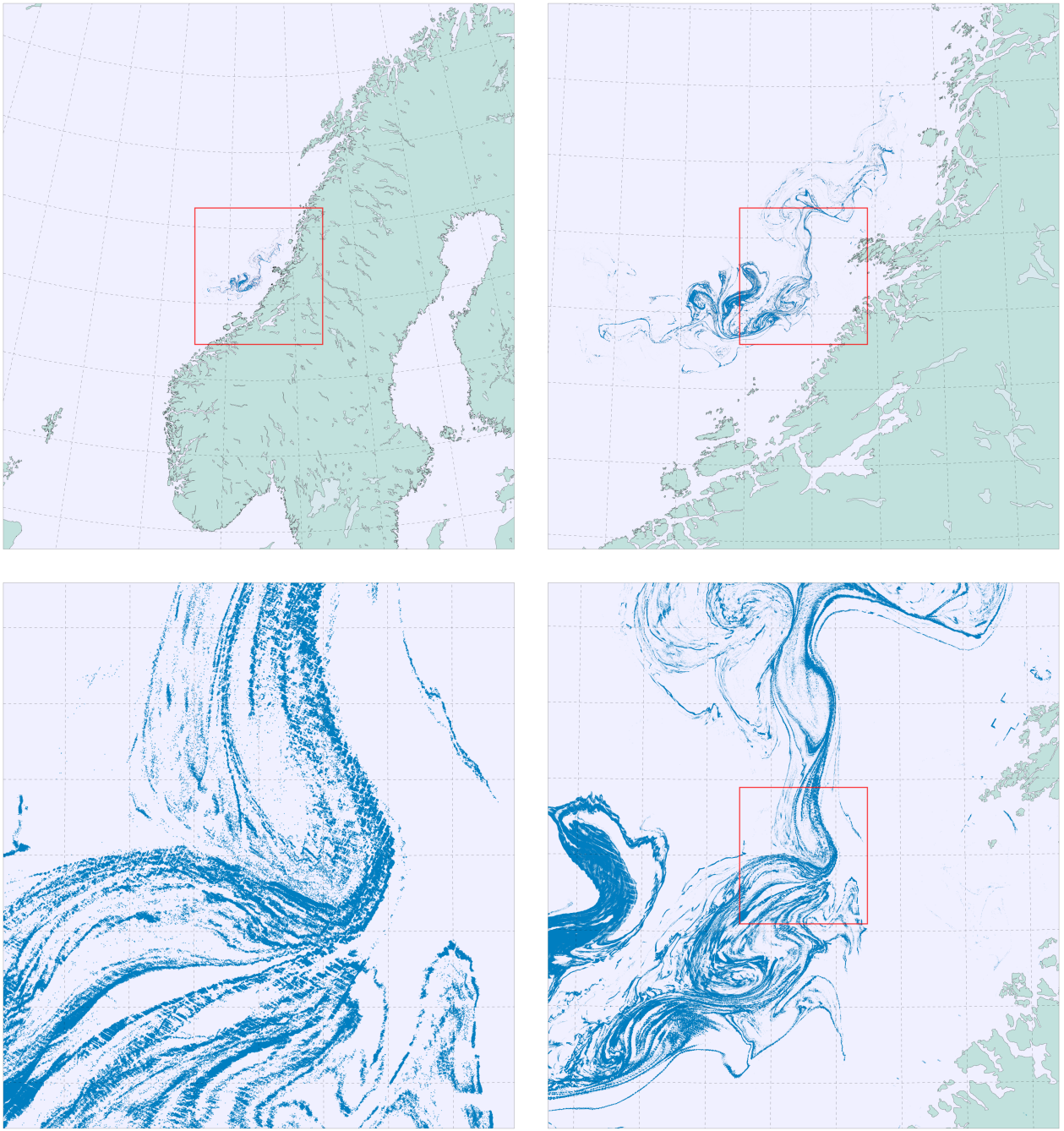
Parallel simulations of transport and mixing in the ocean



The figure on the previous page shows a simulation of 50 million numerical tracers, simulating a dissolved chemical moving in the ocean. The ocean currents used to drive the simulation are downloaded from the Norwegian Meteorological Institute, who provide high-resolution oceanographic data for the entire Norwegian coast.

Transport and mixing

- Can be simulated using
  - Random walk methods (stochastic ODEs)
  - Advection-diffusion equation (gridded PDEs)
- Transport can be driven by
  - Analytically known velocity field
  - Actual ocean current data

We want to:

- Investigate possible applications
  - Transport of ash in the atmosphere
  - Transport of radioactive material in the ocean or atmosphere
  - …
- Look at possible extensions
- Investigate scaling and tuning of parallel code
- Investigate turbulent diffusion

You should:

- Have some experience with programming
- Be interested in learning about parallel programming for a supercomputer

Contact

tor.nordam@sintef.no