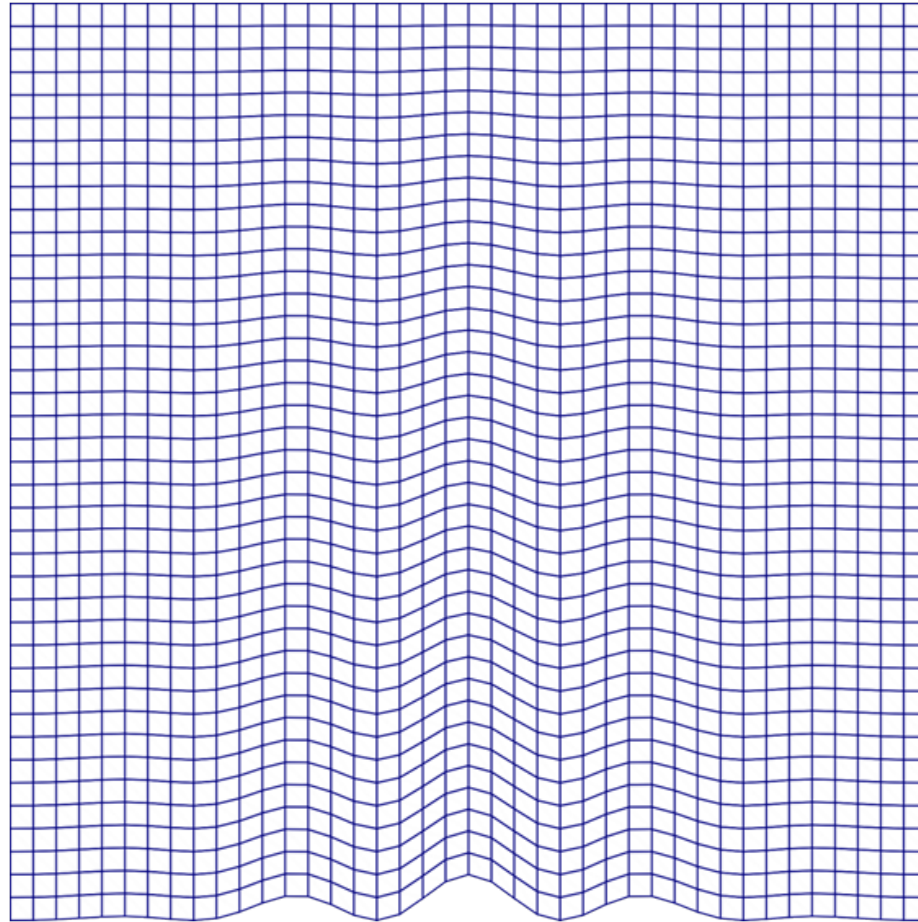
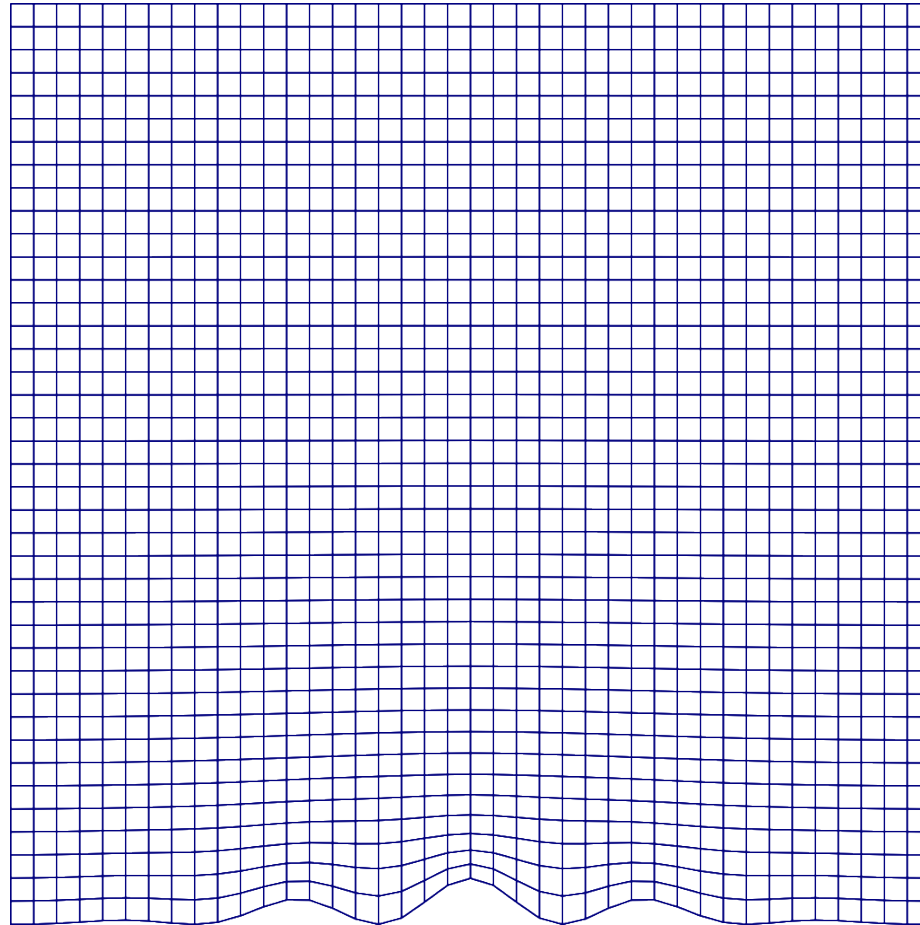


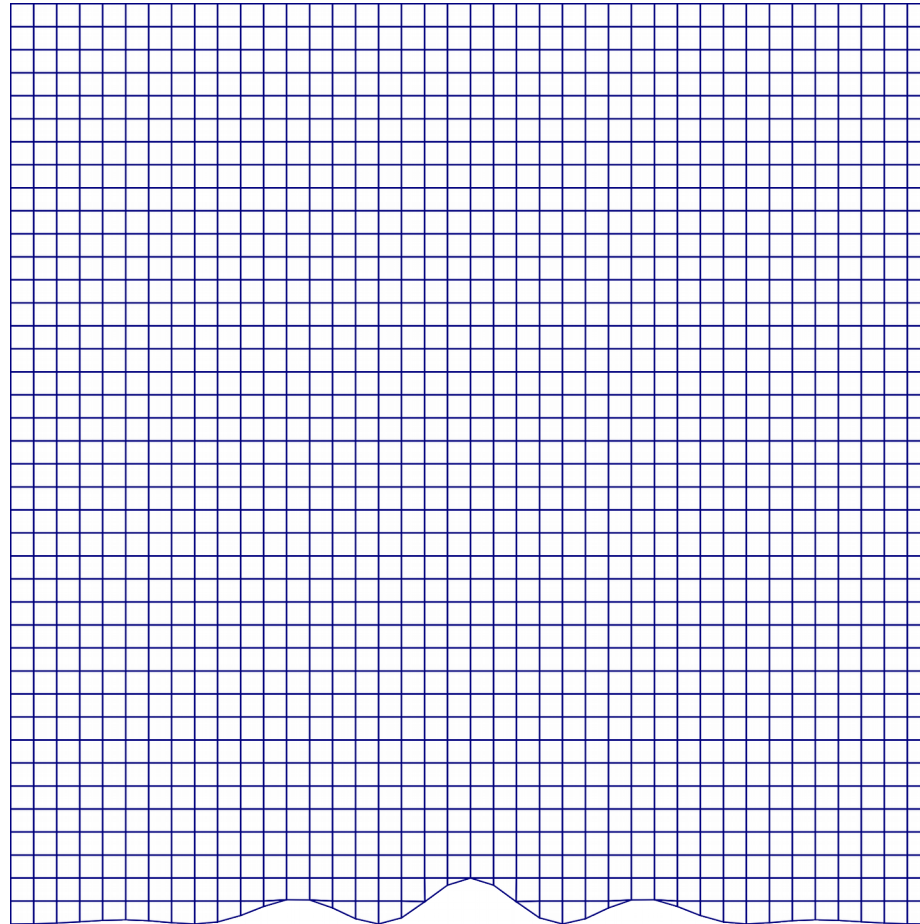
Basic Terrain Following (BTF)



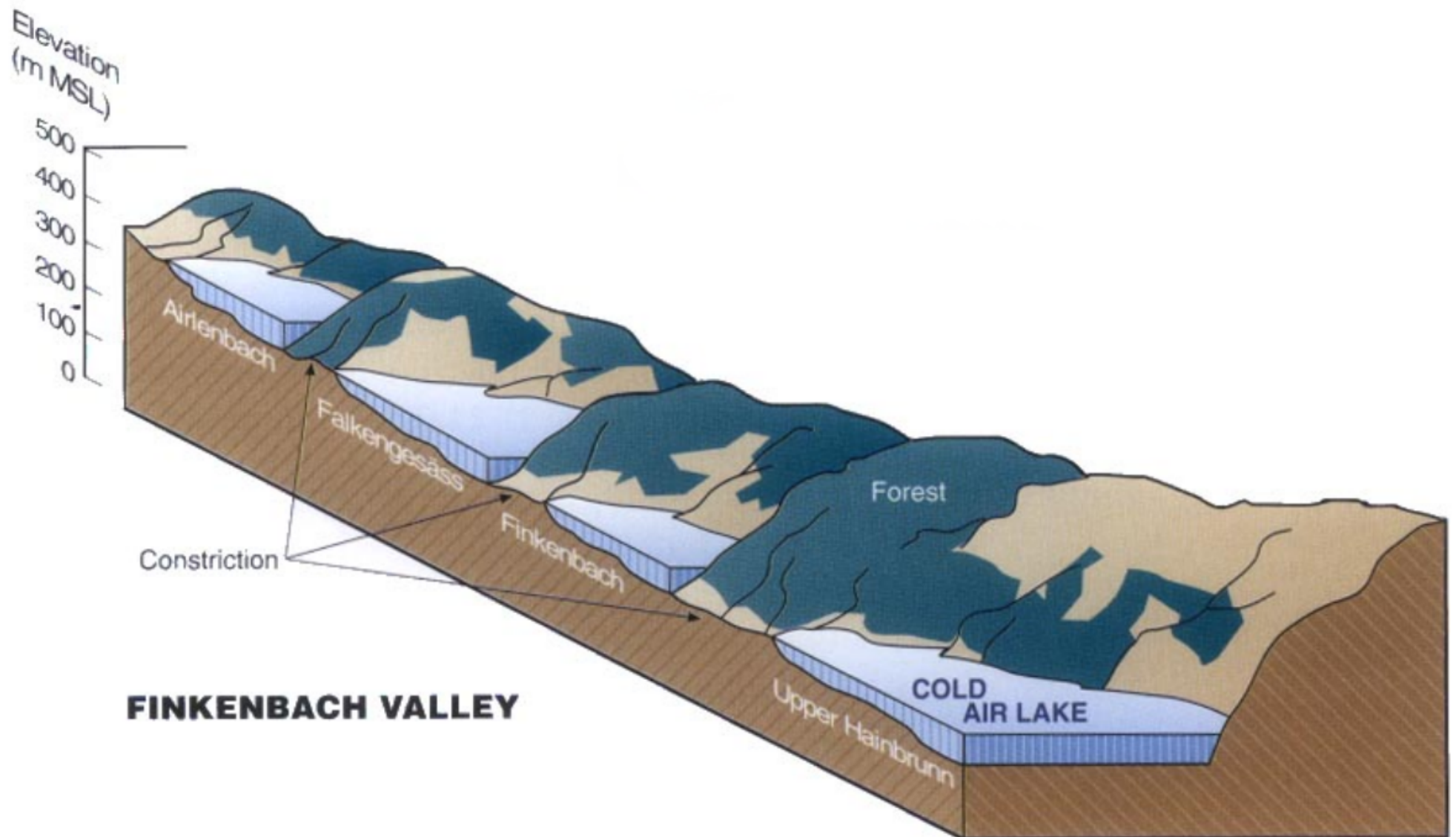
Smooth Level Vertical (SLEVE)



Cut cell



Cold air pools



How do cold air pools affect the
weather?

Air pollution

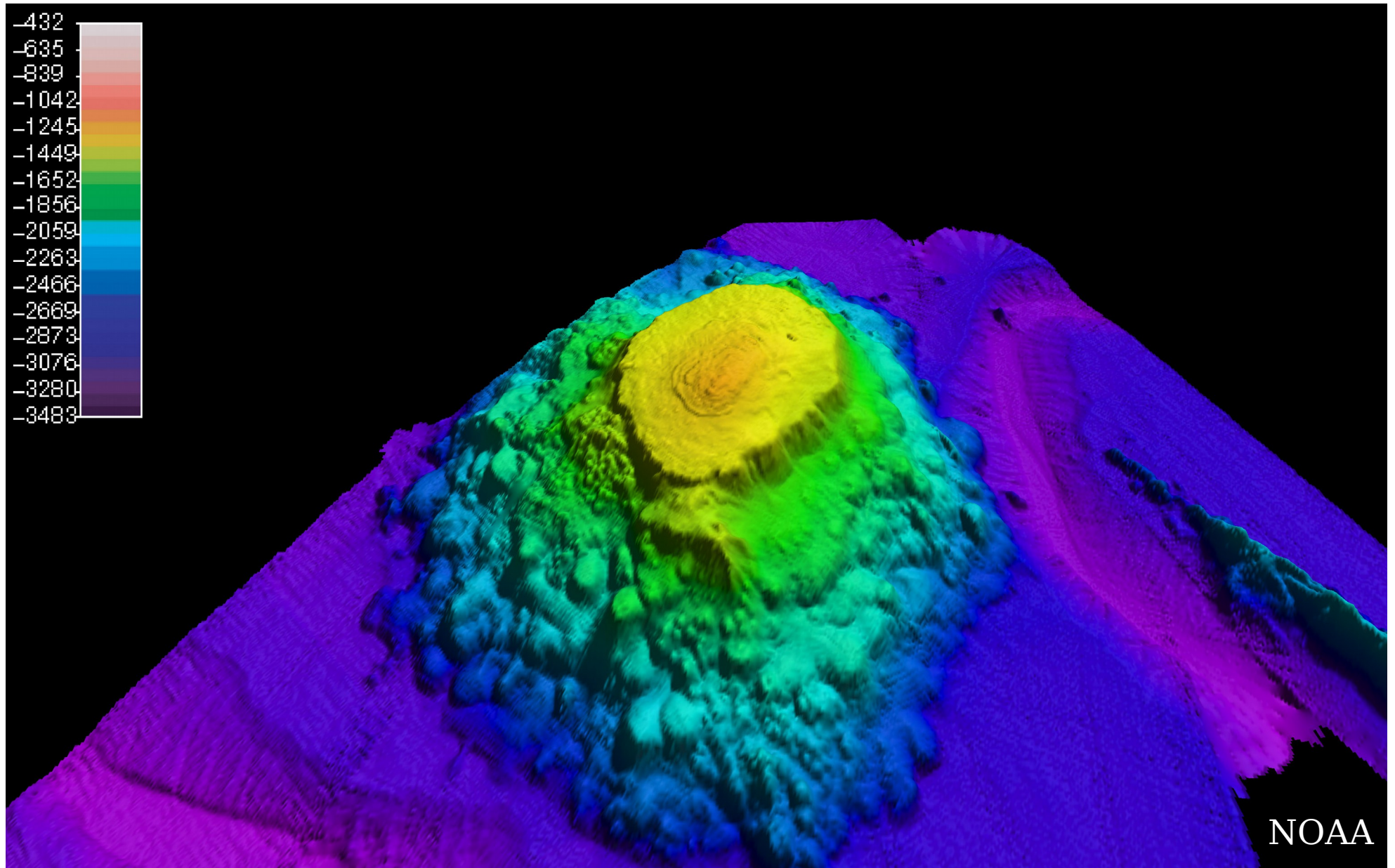


Michael Chow/The Republic

How do cold air pools affect the weather?

- Fog
- Low stratus cloud
- Frost
- Freezing rain
- Delay ice melt affects hydrology

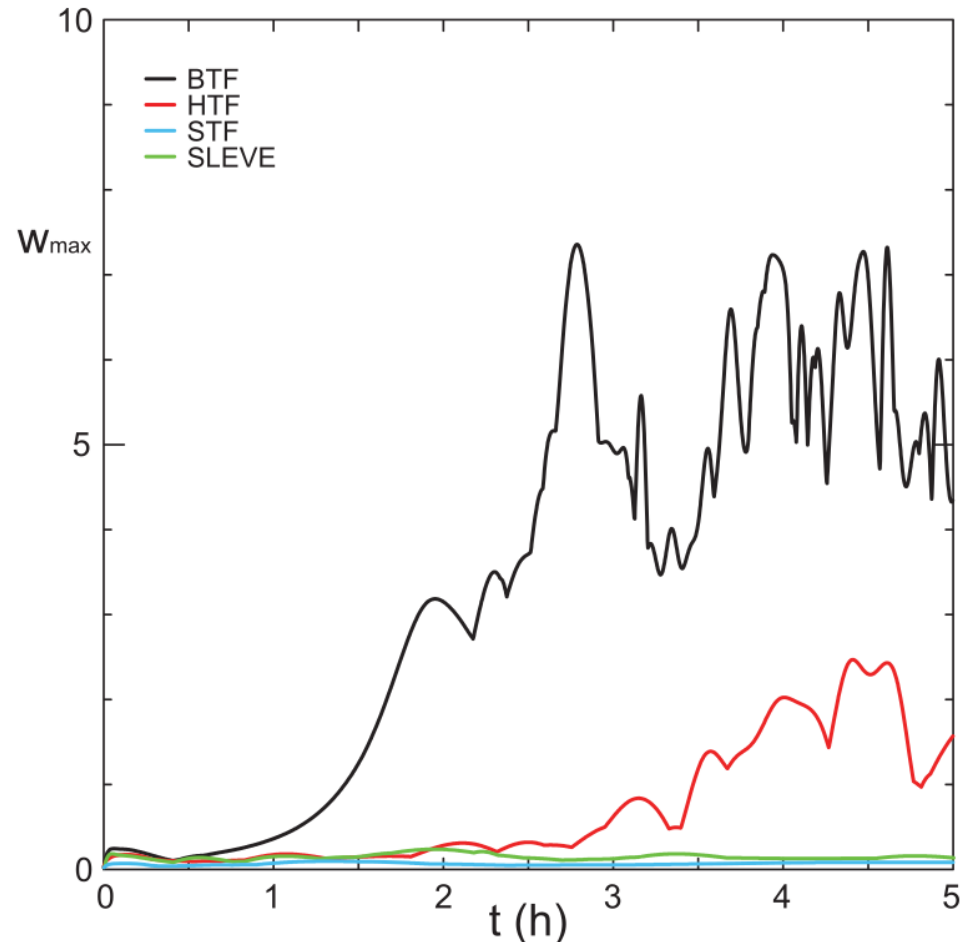
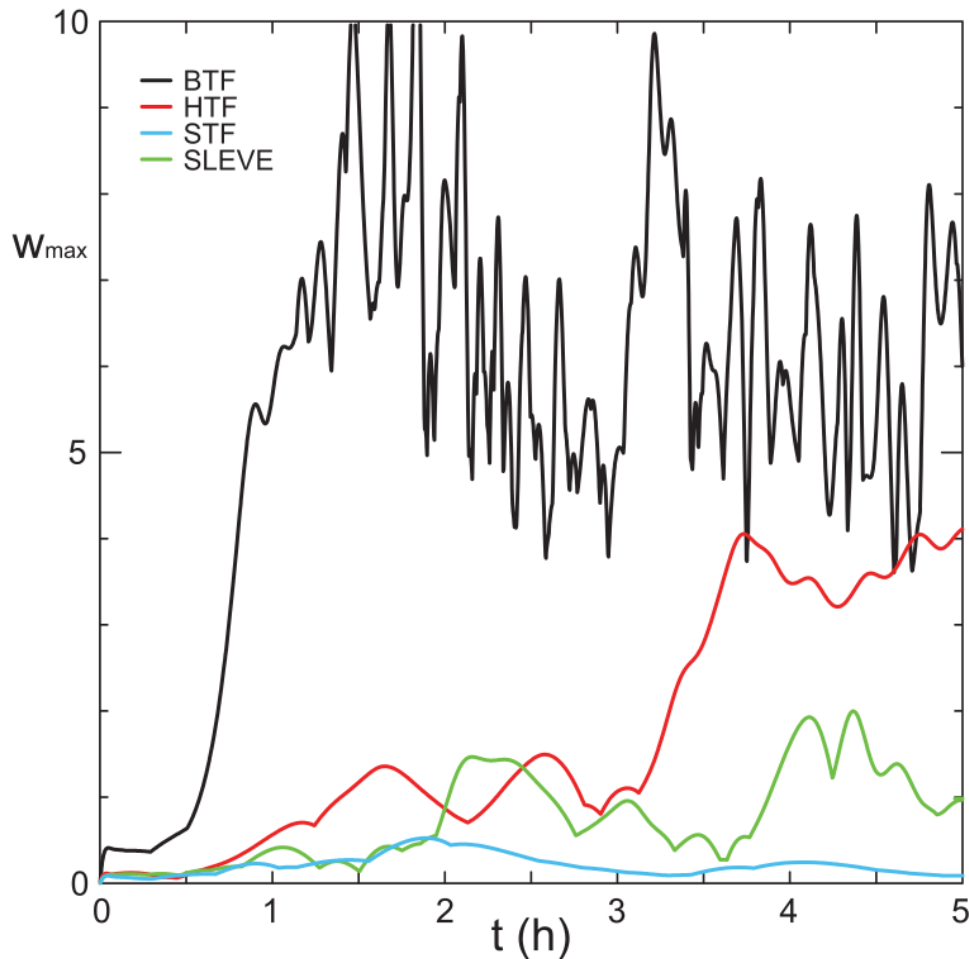
Ocean seamounts



Model results

- Nonhydrostatic model
- Dry dynamical core (no parametrisations)
- Inviscid
- Free-slip lower boundary

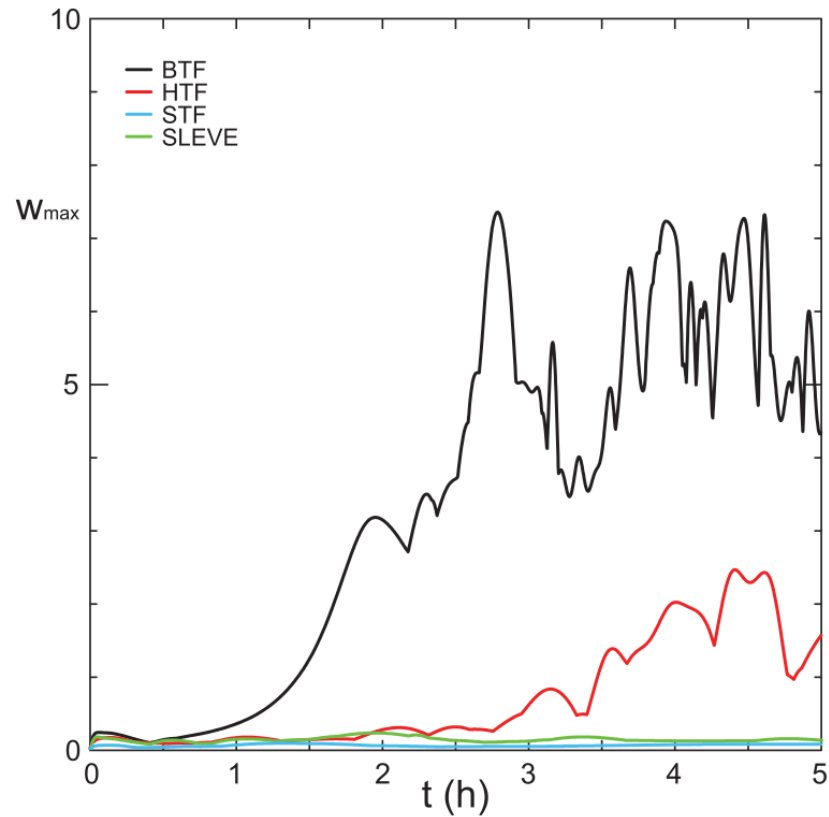
Spurious vertical velocities



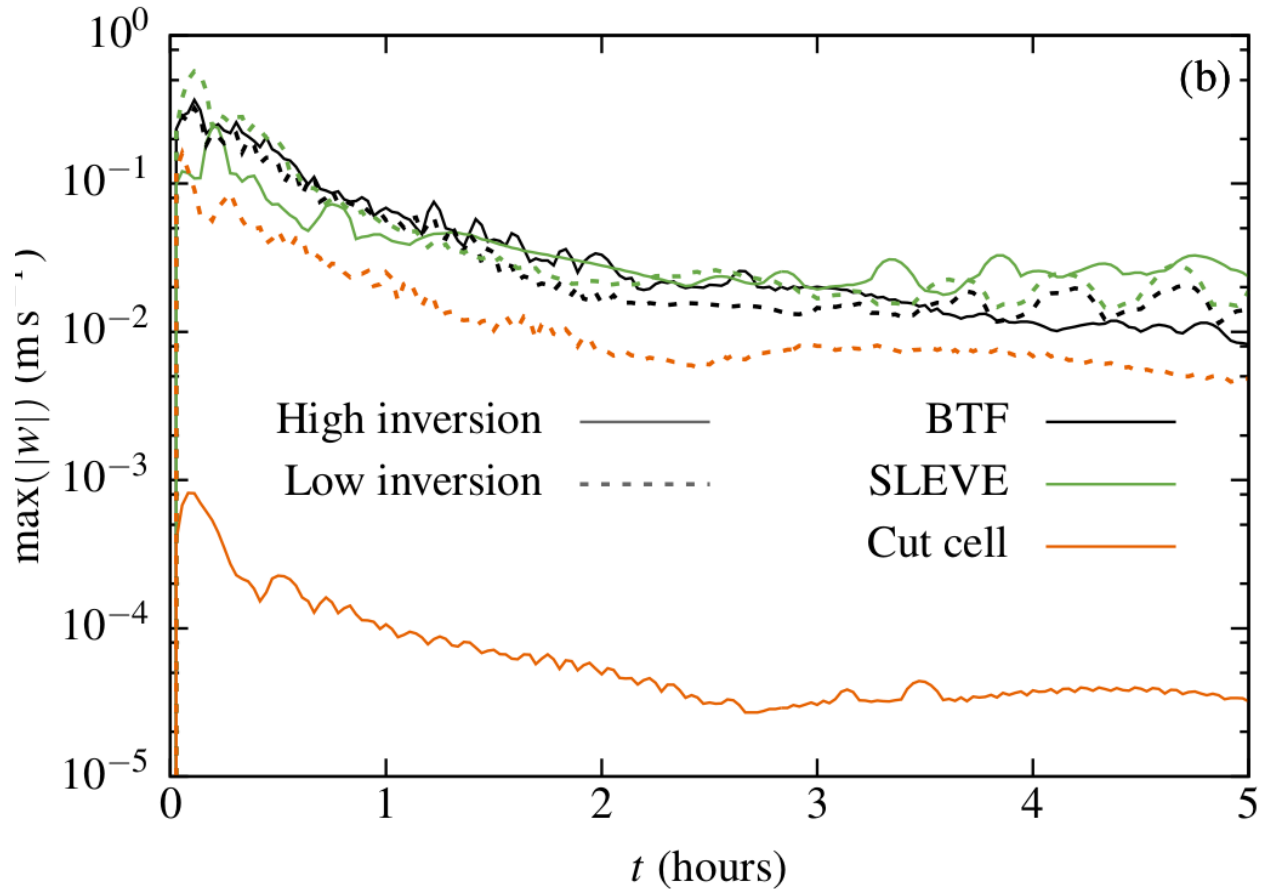
∇p calculated in transformed coordinates ∇p calculated in Cartesian coordinates

Klemp, J. B., 2011: A terrain-following coordinate with smoothed coordinate surfaces. *Mon. Wea. Rev.*, **139**, 2163–2169

Spurious vertical velocities

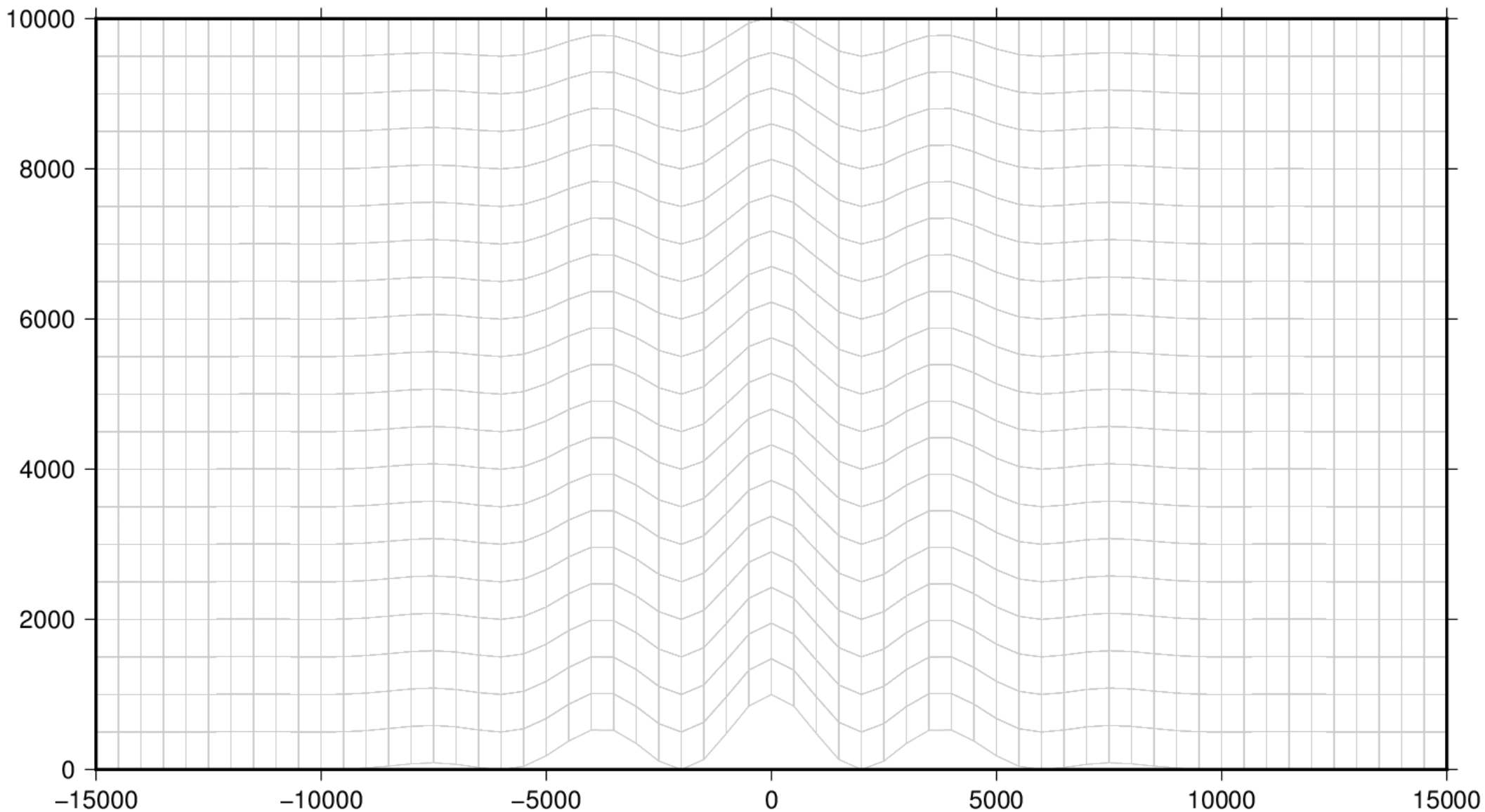


∇p calculated in
Cartesian coordinates

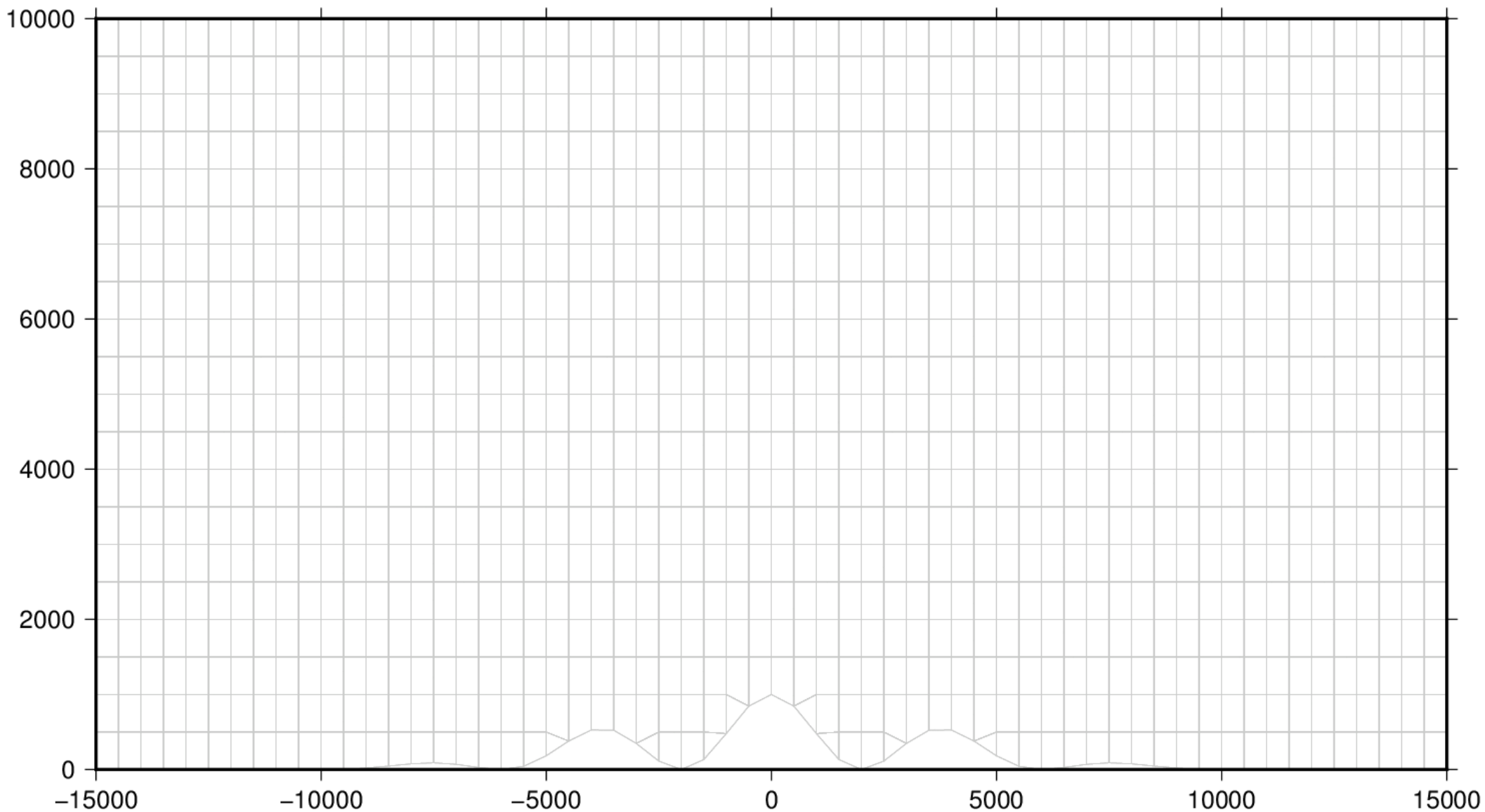


Curl-free pressure gradient formulation

Spurious circulation (BTF)



Spurious circulation (cut cell)



Conclusions

- Curl-free pressure gradient formulation
 - Accurate
 - Mostly insensitive to distortions
- Cut cells may have slight advantages
- More work required on multidimensional advection scheme
 - find out more at PhD Group, 17th February