

Application of Dispersants During The BP Oil Spill:

Important practical problem involving 3D turbulence

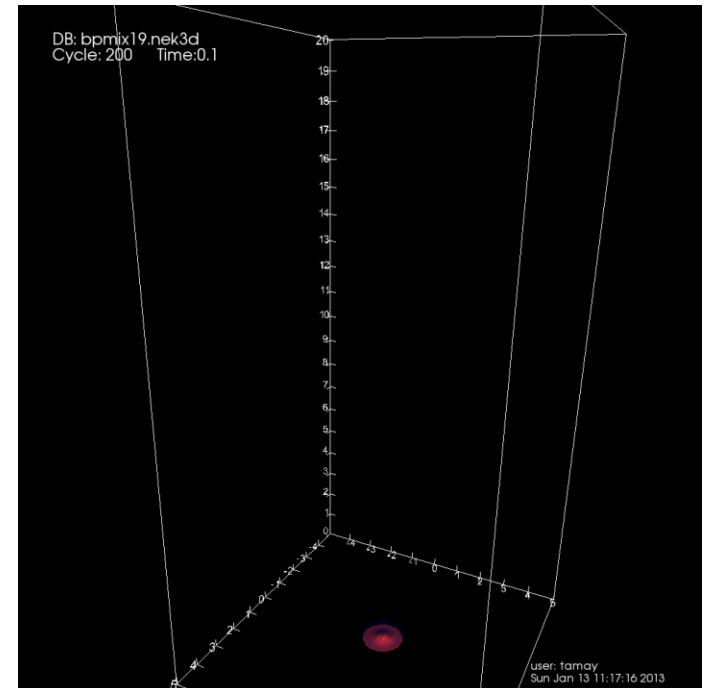


Small source, released in the jet region...

- How effective is the mixing?
- How far from the source for complete mixing?

Computational challenges:

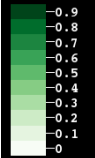
- Very turbulent plume
- Outflow for long integrations
- 75M points, 129k CPU hours (13 years on a laptop)



DB: bpmix19.nek3d
Cycle: 2000 Time:100

Contour

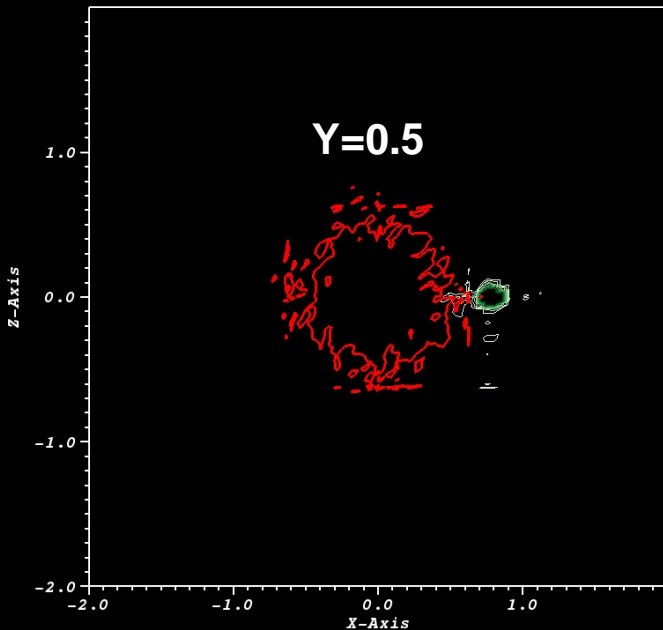
Var: s1



Max: 1.00
Min: 0.00

Contour
Var: temperature

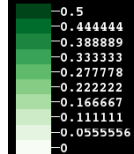
Max: 1.000
Min: 0.000



DB: bpmix19.nek3d
Cycle: 2000 Time:100

Contour

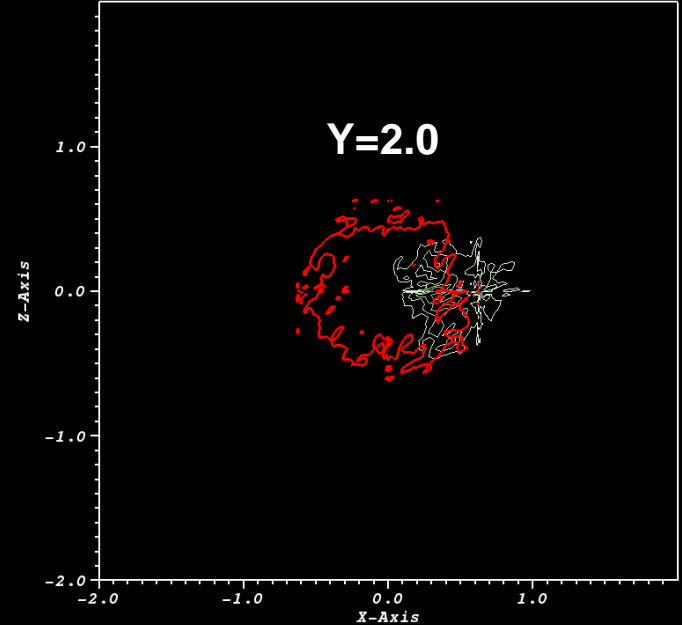
Var: s1



Max: 1.00
Min: 0.00

Contour
Var: temperature

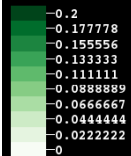
Max: 1.000
Min: 0.000



DB: bpmix19.nek3d
Cycle: 2000 Time:100

Contour

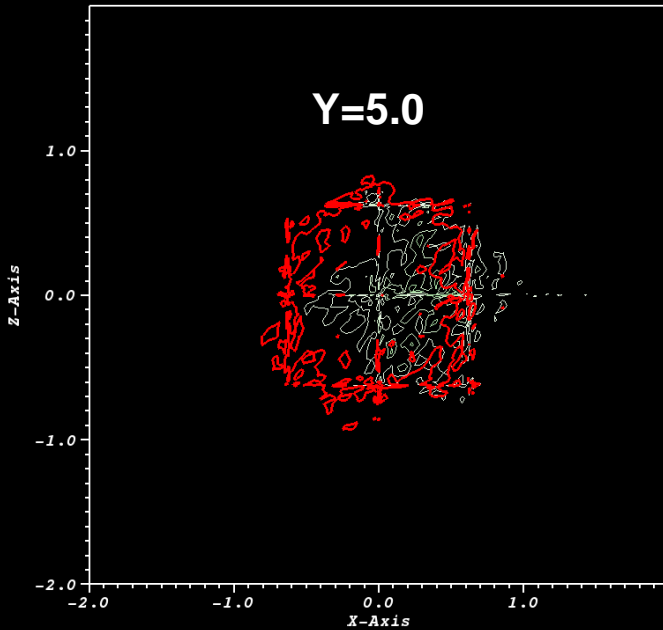
Var: s1



Max: 1.00
Min: 0.00

Contour
Var: temperature

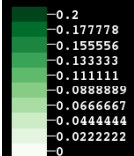
Max: 1.000
Min: 0.000



DB: bpmix19.nek3d
Cycle: 2000 Time:100

Contour

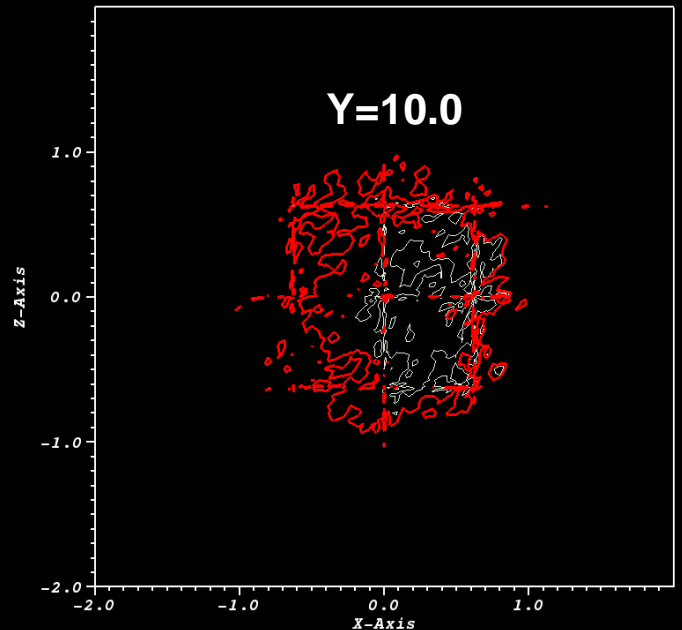
Var: s1



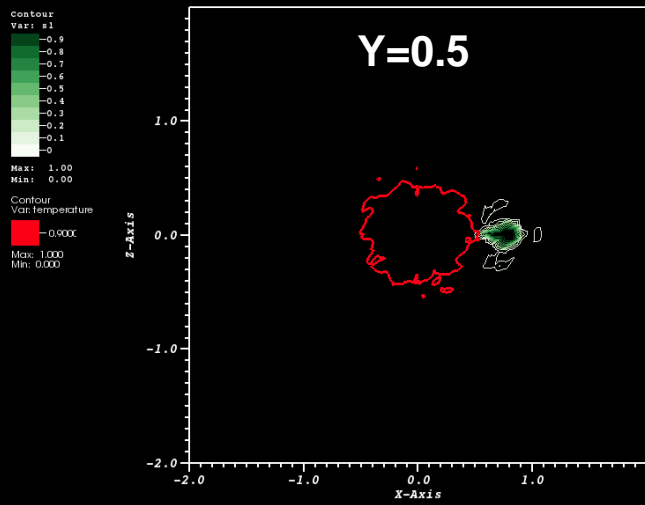
Max: 1.00
Min: 0.00

Contour
Var: temperature

Max: 1.000
Min: 0.000

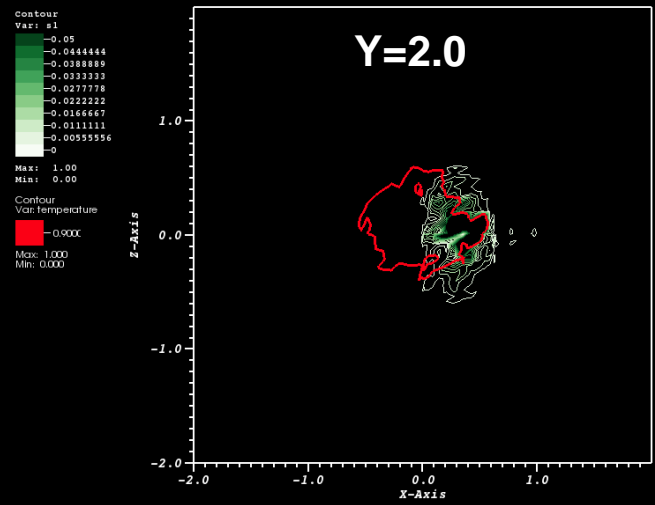


DB: bpmix39.nek3d
Cycle: 1000 Time:100



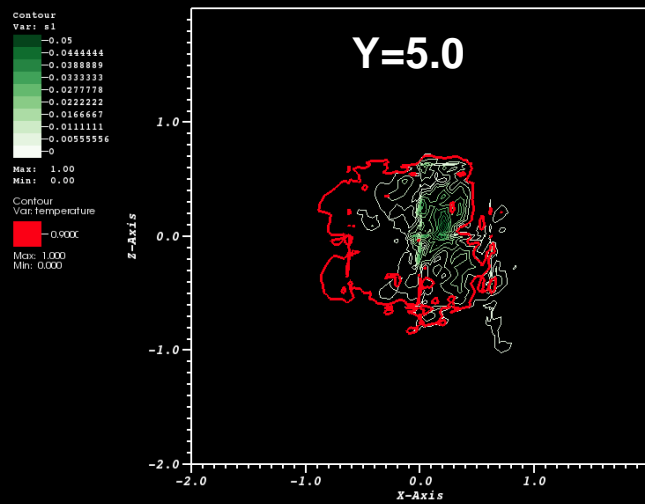
user: lamay
Thu Apr 25 09:46:02 2013

DB: bpmix39.nek3d
Cycle: 1000 Time:100



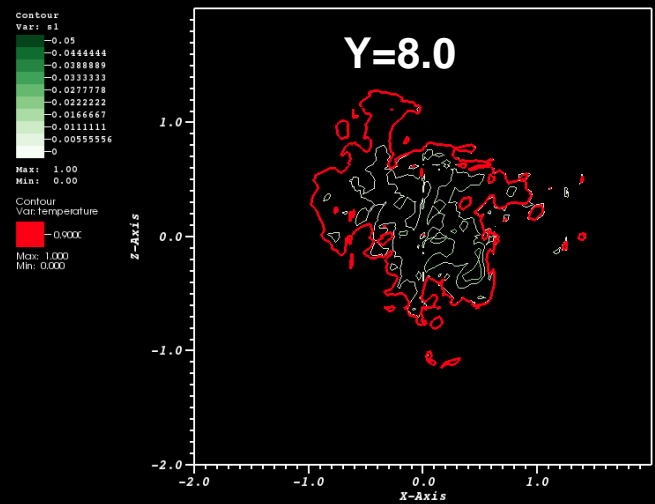
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DB: bpmix39.nek3d
Cycle: 1000 Time:100



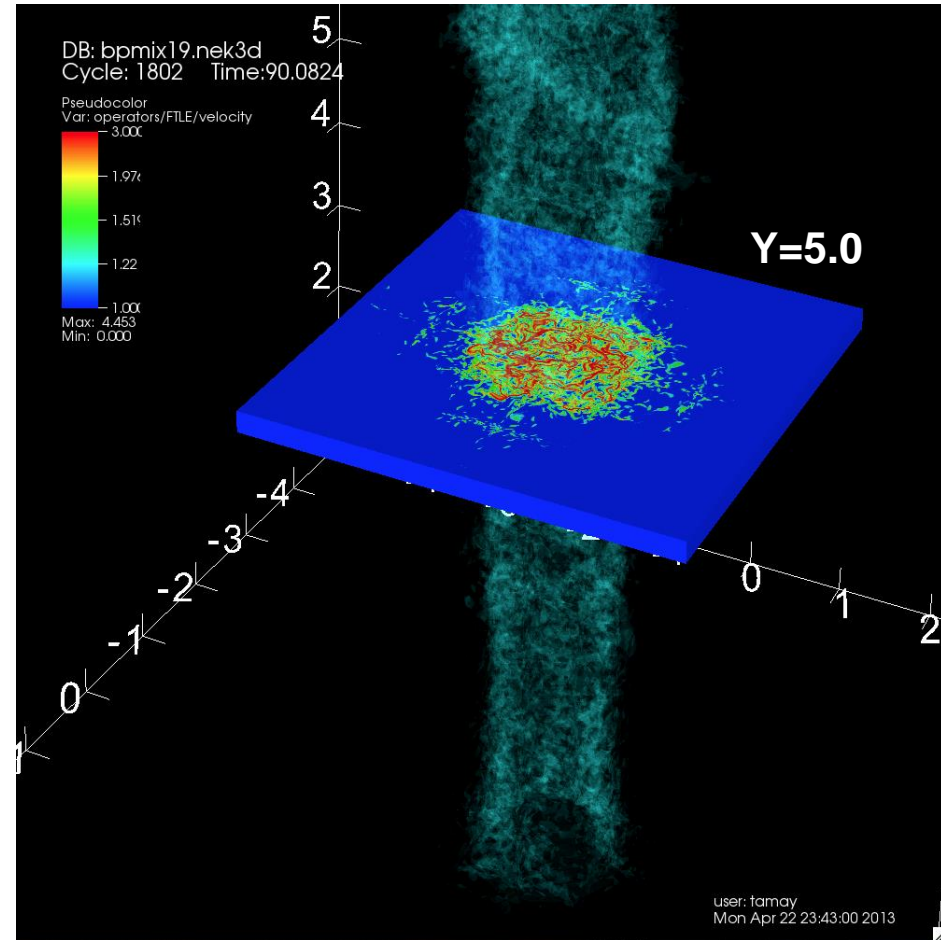
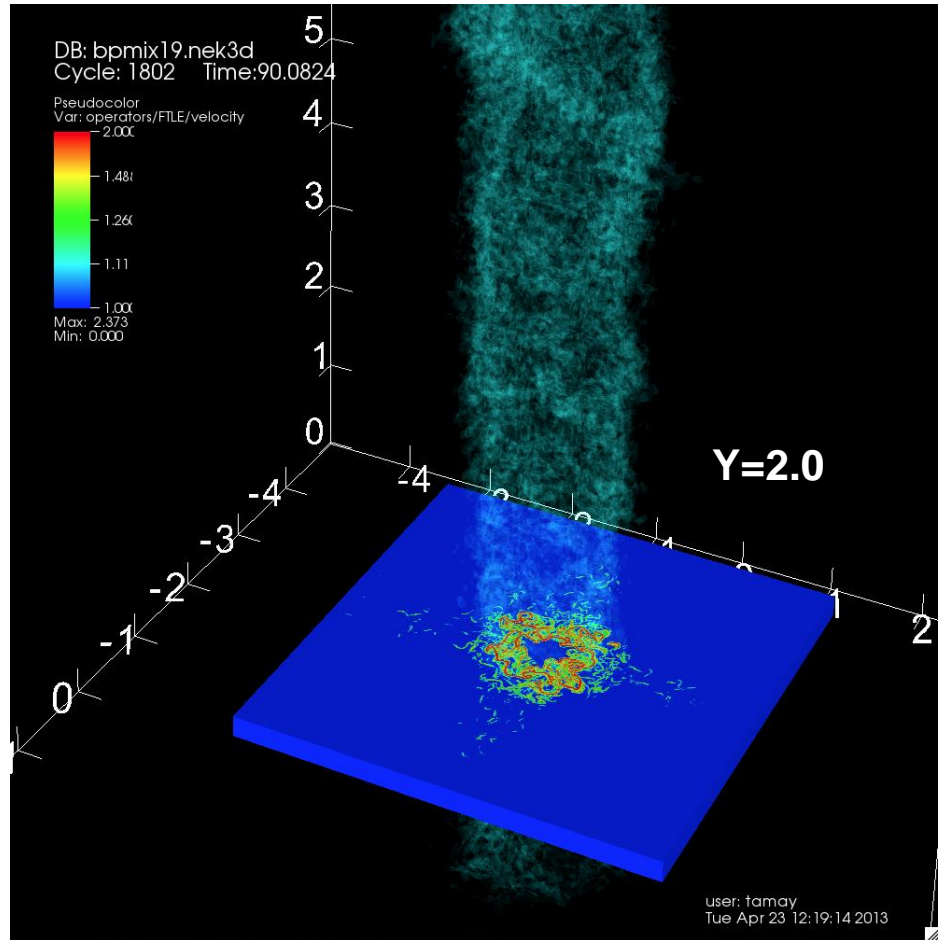
user: lamay
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DB: bpmix39.nek3d
Cycle: 1000 Time:100



user: lamay
Thu Apr 25 09:44:23 2013

3D LCS (Backward FTLE):



Break down of the transport barrier around the jet core after 3 to 5 pipe diameters facilitates mixing internally

3D FTLE View of the Collapse of Jet Core:

