## Multiphase, Multimaterial and Compressible Flows

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Elevator Pitches, 2012

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## Atmospheric Fluidity

At a regional scale the atmosphere can be modelled as a compressible, multimaterial fluid:

- Compressible:
  - pressure local function of material properties, density and temperature
  - Cannot assume  $\nabla \cdot u = 0$
- Multimaterial:
  - Many different consituents (eg. dry air, water vapour, aerosols) all carried by bulk momentum
  - some materials compressible (air), some incompressible (dust), all with own material properties.

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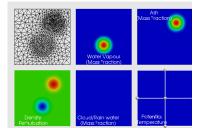
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► Materials change phase (vapor ⇒ice, rainwater) and move relative to each other

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## Atmospheric Fluidity

- Fluidity solves compressible Navier-Stokes
- couple to a multimaterial equation of state
- couple to code to solve for material change of phase, etc (cloud microphysics)
- solve predicitve problems for air-pollutants, volcanoes, extreme rainfall etc.



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