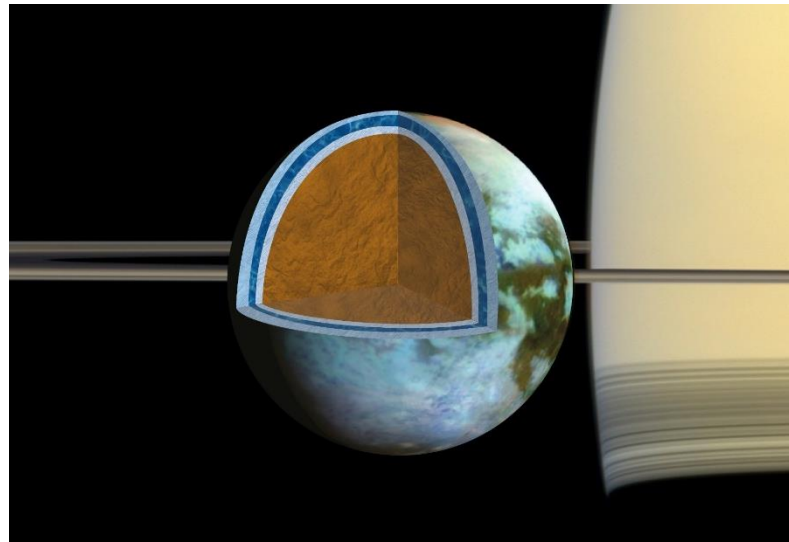


Impact of crustal hydrocarbon clathrate on the dynamics of Titan's outer ice shell

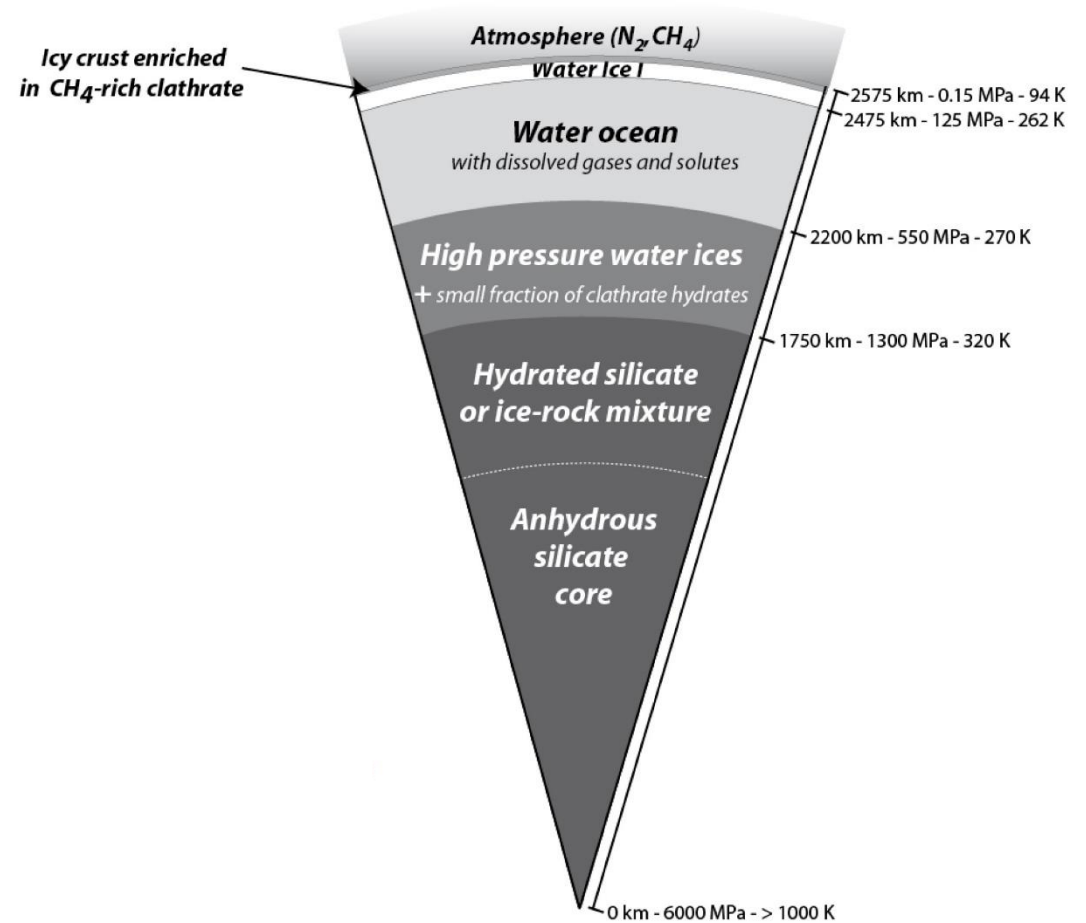
Ludivine Harel & Gabriel Tobie

Laboratoire de Planétologie et de Géodynamique, UMR-6112, CNRS, University of Nantes, France

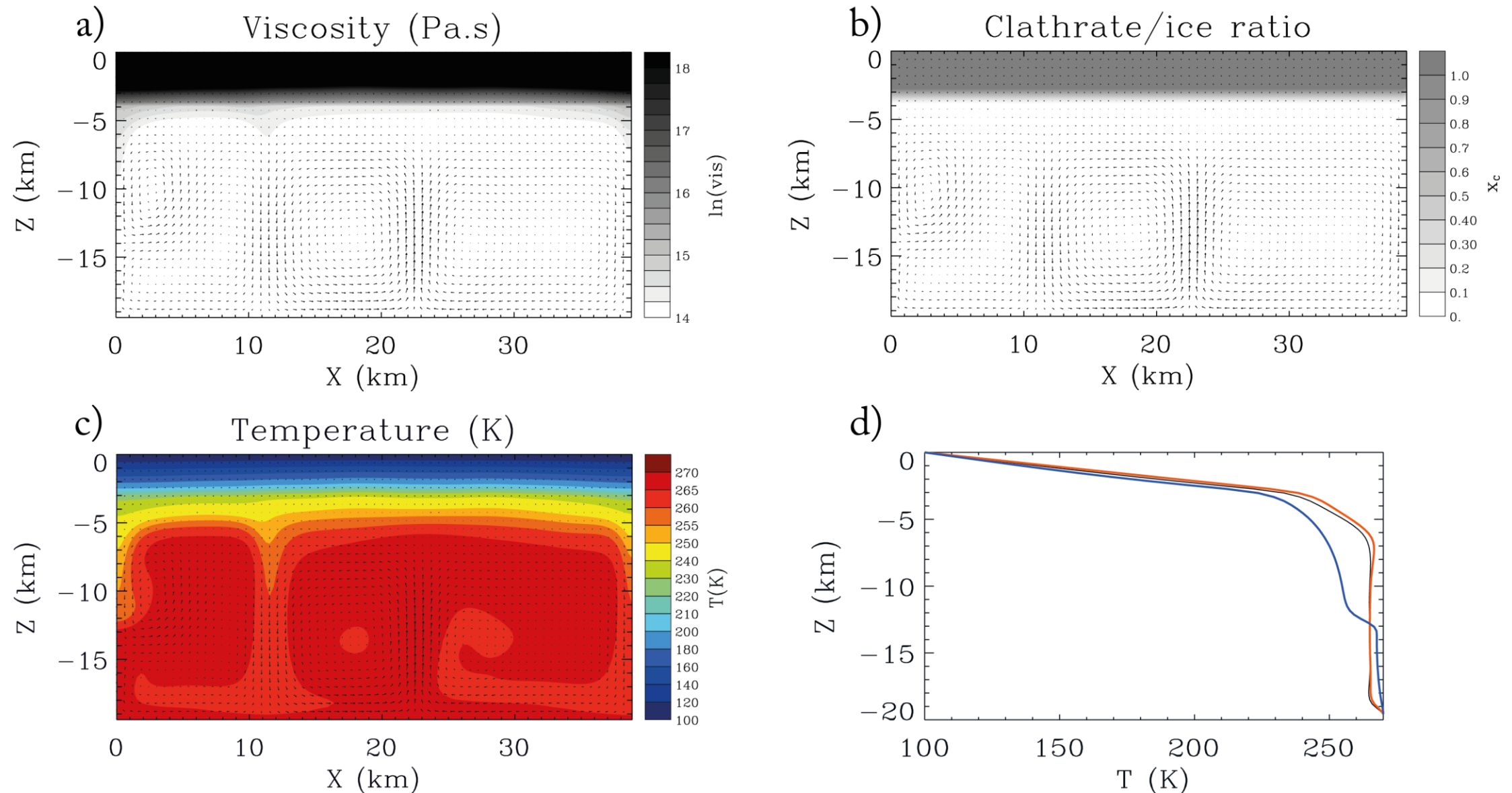


Titan

- Thick atmosphere enriched in methane
 - Photolyse in upper atmosphere methane → others organic compounds (ethane)
- Methane would disappear in a few tens of millions years
- There must exist a hydrocarbon reservoir : clathrates



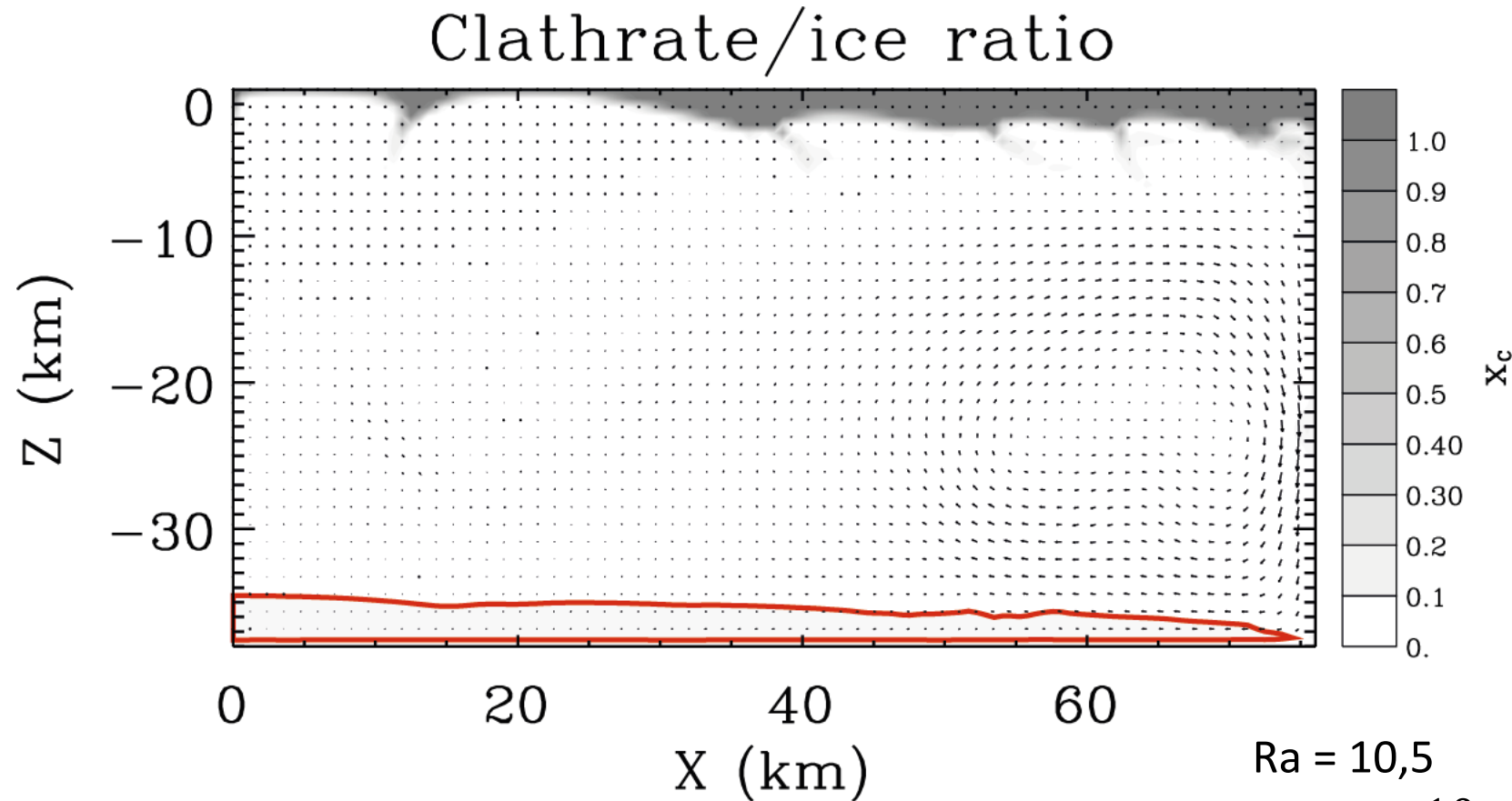
Initial situation : convective steady-state



Destabilization of clathrates

Clathrates migrate to form a layer above the ocean/ice interface.

This leads to changes in ice shell dynamics.



$Ra = 10,5$
 $c_{dens} = 10$
 $c_{visco} = 1$
 $t = 1,4 \text{ Ma}$