

22ème Rencontre du Non Linéaire - 26-28 Mars 2019

Valérie Vidal, Tess Homan, Clément Picard, Sylvain Joubaud

Context and objectives

Importance of gas release at the ocean floor
in natural or industrial phenomena

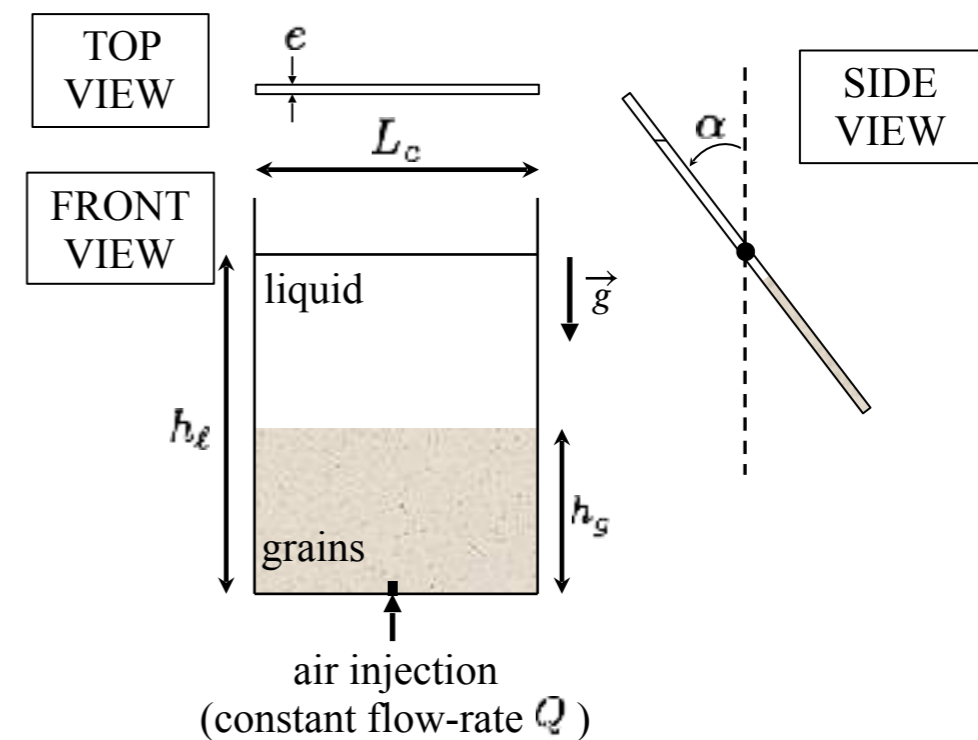
Natural gas seepage on the seafloor



Key question: how particles are entrained by the
gas and then mixed into the ambient fluid ?

Laboratory experiments:
gas rising through liquid-saturated sands

Experimental setup



- **Hele-Shaw cell**

$$L_c = [136, 240, 356] \text{ mm}$$

$$e = [2, 3] \text{ mm}$$

$$\alpha = [0 - 55]^\circ$$

- **Liquid**

ethanol (to avoid aggregates)

- **Particles**

PVC, polystyrene

$$d \sim [100 - 300] \mu\text{m}$$

Monodisperse or strongly
polydisperse

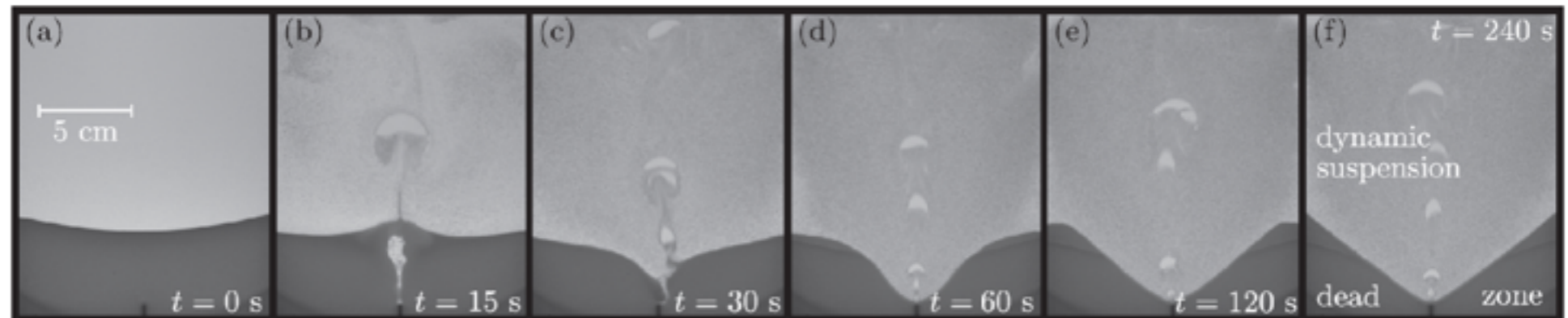
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Vertical cell

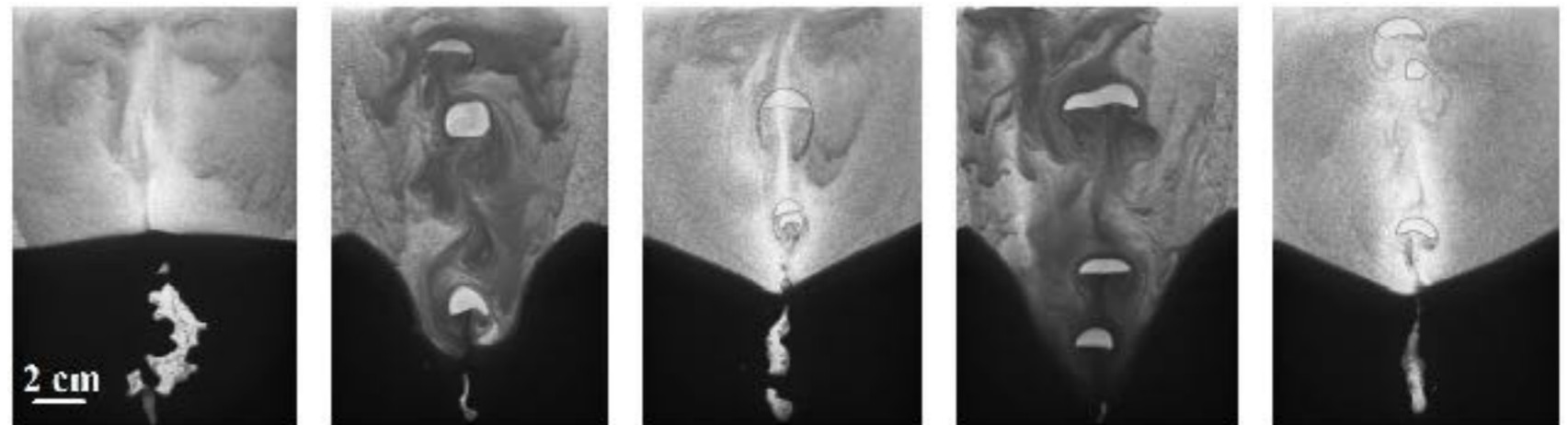


Stationary state: Equilibrium between
ENTRAINMENT vs **SEDIMENTATION**

A simple model to quantify
the particles in suspension?

Inclined cell: A puzzling regime

- No stationary state!
- “oscillations” of the suspension packing fraction with **violent particle suspension events**



Regime diagram?