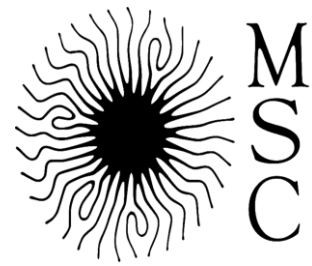


# Fragmentation of a granular raft by surface waves



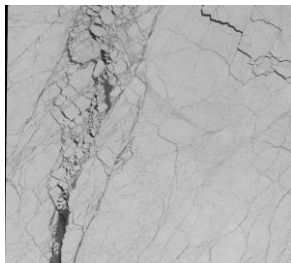
**MSC:** Laboratoire Matière et Systèmes Complexes  
UMR 7057 CNRS / Université Paris Cité



**Michael Berhanu** (CR CNRS, MSC), with  
**Louis Saddier** (ENS Paris Saclay), **Ambre Palotai** (ENS, PSL), **Mathéo Aksil** (ENS, PSL)  
& **Michel Tsamados** (Centre for Polar Observation and Modelling, University College London)



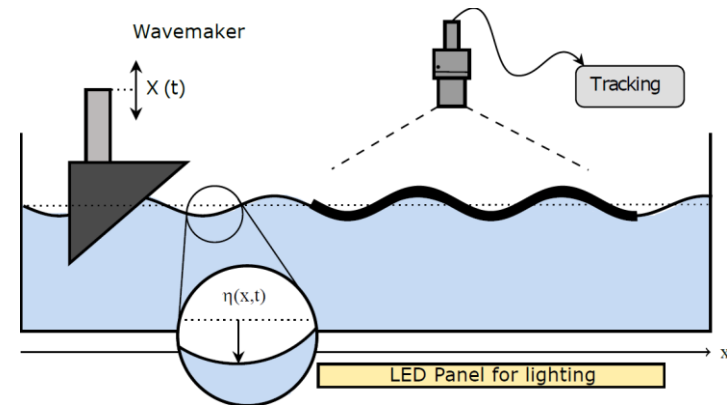
Tea skin



Arctic Sea ice  
(satellite SPOT)



Sea ice fragmentation  
⇒ Polygonal ice floes

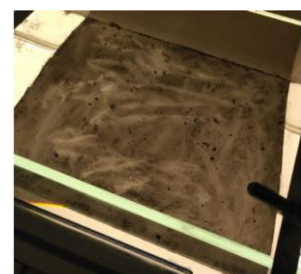
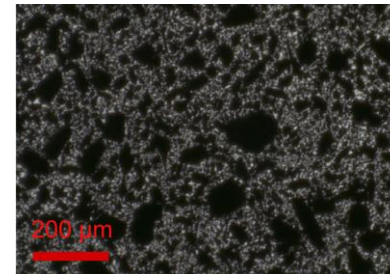


- Macroscopic analogy.

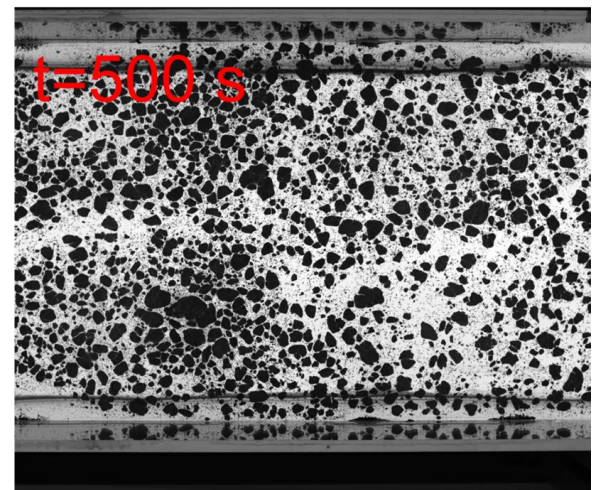
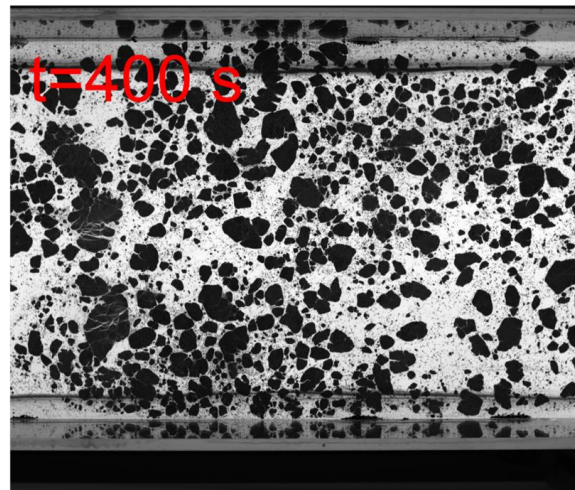
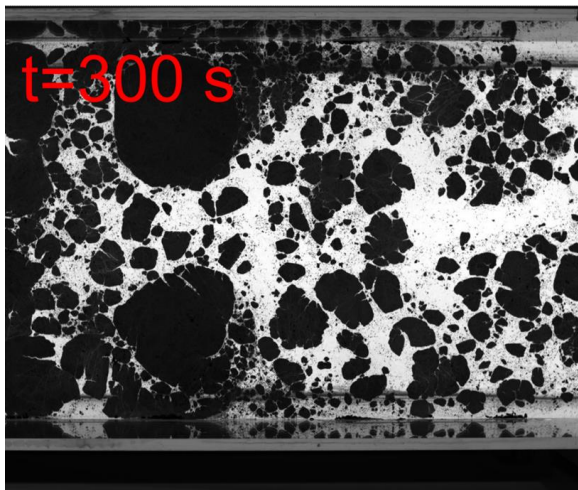
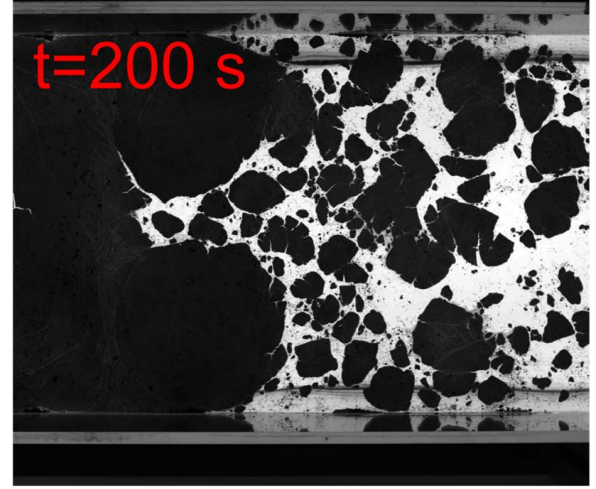
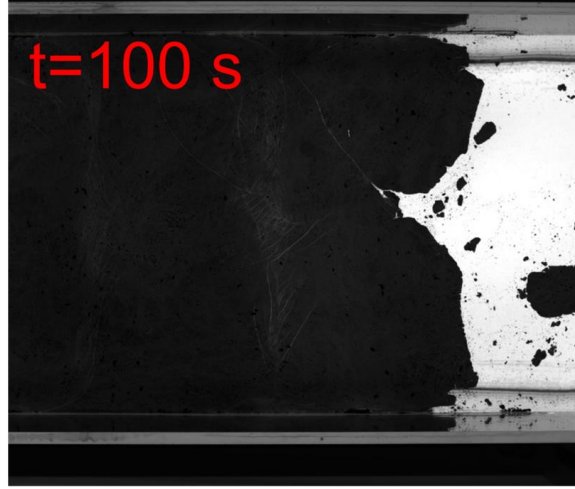
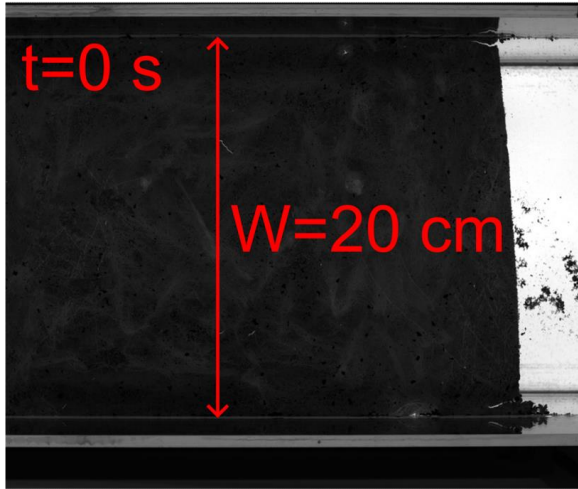
Fragmentation of a thin floating membrane  
by surface waves.

Use of Graphite powder (10  $\mu\text{m}$  particles).

Cohesion by capillary interactions (Cheerios effect),



# Fragmentation of a granular raft by surface waves



- Regular sine waves of  $f=3.0\text{ Hz}$  and  $a=1.48\text{ mm}$ , coming from the right. Oblique cracks in the bulk. Polygonal cracks on the edges  $\Rightarrow$  Fragmentation. Role of the viscous stress due to the underlying flow  $\Rightarrow$  Induced drift of floes.