

*Mapping the flow during retreating subduction:
laboratory models analyzed by Feature Tracking*

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preface

Goal: characterize the 3-D induced flow triggered in the mantle by slab motion

Tool: Analogue models

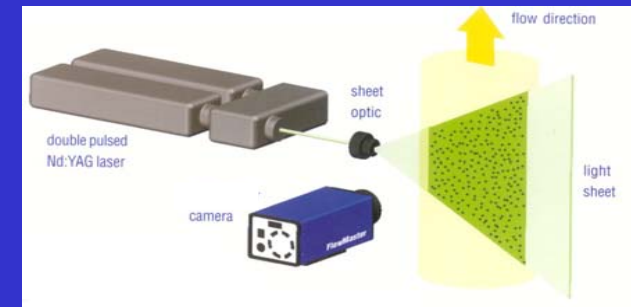
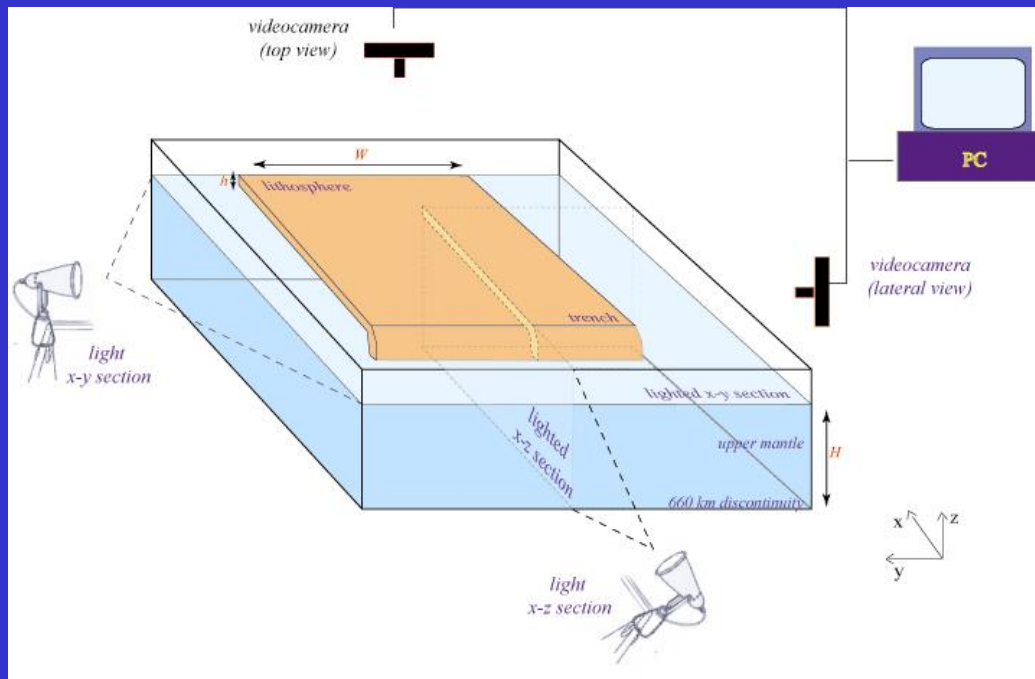
Advantages: 1) 3-D approach;

2) Self-consistent subduction;

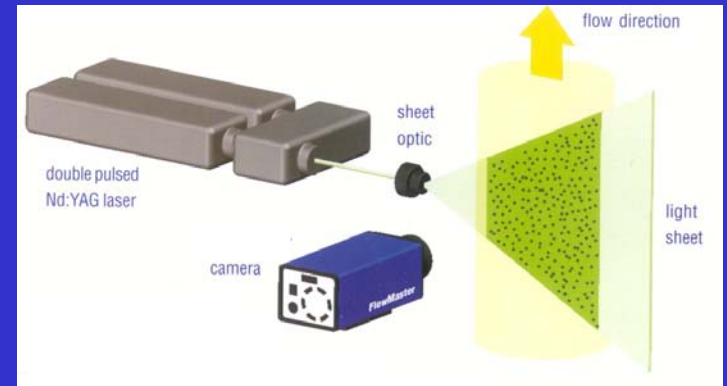
3) Quantitative analysis of mantle flow;

4) Comparison with numerical models (see the poster “*3-D numerical instantaneous flow models induced by subduction*” by Piromallo et al.).

setup



FEATURE TRACKING (FT) VELOCIMETRY

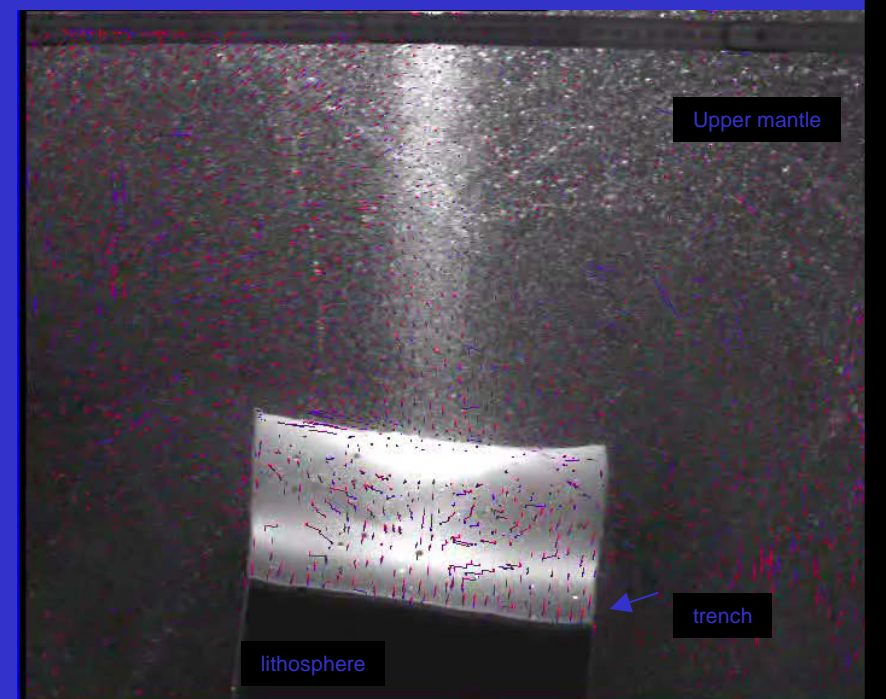


Poloidal Flow



lateral view

Toroidal Flow



top view

results

- Poloidal and toroidal mantle circulation are both active since the beginning of the subduction process. The poloidal component is the answer to the viscous coupling between the slab motion and the mantle. The toroidal component is produced by the lateral slab migration.
- Episodicity of mantle circulation.
- Plate width influences mantle circulation.
- The description of mantle flow in subduction zones cannot be correctly approached by models assuming a 2-D steady state process (→ “*corner flow theory*”).