

Geophysical Research Abstracts, Vol. 9, 06128, 2007  
SRef-ID: 1607-7962/gra/EGU2007-A-06128  
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## **Externally driven subsurface fluid pumping and consequences.**

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Thibodeaux & Boyle (1987) showed by analog modeling that convective transport in sediments can be generated by the presence of bedforms (e.g. sand ripples). This process is known to be of great importance for the biogeochemistry of the subsurface realm in many settings (e.g. rivers, shelf sediments,...).

A multiphysics model was developed to numerically explore this process in deep-sea environments. The model integrates a stream over different seafloor obstacles, pressure effects at the sediment surface and the there from resulting subsurface fluid flow. Additionally, the geochemical consequences in settings where anaerobic methane oxidation is an important process, are simulated through a simple second order kinetics model.

Through this model, we simulated two submarine settings: deep-sea carbonate mounds and seafloor pockmarks. The model is further evaluated by comparing natural examples of these features with the model results.

### Reference:

Thibodeaux, L. J. and J. D. Boyle (1987). Bedform-Generated Convective-Transport in Bottom Sediment. *Nature* 325(6102): 341-343.