IUTAM/AMERIMECH SYMPOSIUM

Title: Dynamics of Gravity Currents

Location: UC Santa Barbara
Date: Tentatively September 25-27, 2017
Organizers: Eckart Meiburg (UC Santa Barbara) and Ben Kneller (University of Aberdeen)

SCIENTIFIC COMMITTEE: Gary Parker-USA, Paul Linden-UK, Balachandar-USA, Nick Ouellette-USA, Julien Chauchat-France, Roger Nokes-New Zealand, Bruce Sutherland-Canada, Claudia Cenedese-USA, Zhiguo He-China, Mario Franca-Switzerland

BACKGROUND: Gravity currents represent a ubiquitous phenomenon in nature and technology. They constitute predominantly horizontal flows driven by hydrostatic pressure gradients as a result of density variations due to differences in temperature, chemical composition or suspended particles. Examples of atmospheric gravity currents include sea breezes and thunderstorm outflows, while buoyant river plumes and the Mediterranean and Red Sea outflows represent important oceanic gravity currents. Within the realm of technical applications, gravity currents are encountered under a large variety of circumstances, including the heating and cooling of buildings, tunnel fires, within water treatment facilities, as oil slicks on the ocean's surface, or during CO_2 sequestration in depleted oil reservoirs. Turbidity currents, snow avalanches, pyroclastic flows and haboobs represent a class of gravity currents in which the particles are largely or wholly suspended by fluid turbulence. The turbulence is largely generated at the lower and (where unstable) upper boundaries of the domain by the forward motion of the current, the motion in turn being driven by the action of gravity on the density difference between the particle-fluid mixture and the ambient fluid. The ambient fluid is generally of similar composition to (and miscible with) the interstitial fluid, and, in most natural cases on Earth's surface, is water or air. Particulate gravity currents are non-conservative in that they may exchange particles with the bed by deposition or suspension, and may exchange fluid with the ambient by entrainment or detrainment.

GENERAL OBJECTIVES: To bring together engineers, geoscientists and oceanographers to survey the current state of our understanding of gravity currents of all types, from theoretical, computational and experimental perspectives and from direct observations in the environment, with an emphasis on their fluid mechanics. A primary mission of the workshop is to foster collaborations between researchers with diverse backgrounds, such as engineers, physicists, oceanographers, atmospheric modelers and geoscientists.

We welcome contributions on a variety of topics including, but not limited to:

- dynamics of compositional gravity currents
- gravity currents in porous media
- dynamics of particulate gravity currents
- quantifying the role of erosion and deposition
- conceptual models for gravity and turbidity currents
- high-resolution simulations of gravity and turbidity currents
- interaction of gravity/turbidity currents with bottom topography and stratified ambients

FORMAT: The workshop will be by invitation only, and it will be held at UC Santa Barbara in 2017. We estimate that approximately 50 people will attend. There will be no parallel sessions, and there will be ample time for in-depth and roundtable discussions.