

Title: Multiscale Interactions in Geophysical Fluids  
Dates: 14 August - 20 August 2016  
Organizers: Rupert Klein, Berlin  
Shafer Smith, New York  
Jacques Vanneste, Edinburgh  
Code: 1633

#### Abstract:

The dynamics of the atmosphere and ocean involves a broad range of spatial and temporal scales, many of which emerge through complex nonlinear mechanisms from forcings at very different scales. This poses major challenges for the numerical prediction of the weather, ocean state and climate: many processes have scales that are too small to be resolved yet they play an essential role in determining large-scale features. This workshop will examine how modern mathematical methods -- ranging from multiscale asymptotics to adaptive numerical methods and stochastic modelling -- can be applied to represent the large-scale impact of these small-scale processes and improve both deterministic and probabilistic predictions. It centres around (i) fluid-dynamical processes, involving the interactions between turbulence, waves and the transport of active tracers, (ii) modelling strategies, especially stochastic parameterisation, and (iii) their numerical implementation. The interplay between these three aspects is the source of many mathematical problems at the interface between PDEs, dynamical systems and numerical analysis, with both fundamental interest and practical impact.