Date: February 29

Time: 11:00 AM

Location: Maryland Hall 110

Speaker: Dr. Rupert Klein

Potsdam Inst. for Climate Impact Research

Title:*"Core structure and motion of intense atmospheric vortices"*

Abstract

We are interested in the physical mechanisms governing (i) the amplification and decay and (ii) the large scale motion of established tropical storms. Vertical environmental wind shear tends to tilt an upright vortex against the vertical. How can a hurricane adjust to resist this shear? Given such background winds that depend on the vertical, how does such a vortex select a mean horizontal travelling speed? What is the role of moisture in these processes?

This presentation will summarize matched asymptotic analyses designed to address these questions in the idealized case of nearly axisymmetric vortex structures. We consider atmospheric vortices in the gradient wind regime which are embedded in a quasi-geostrophically balanced background flow. The effects of moisture are systematically incorporated. Several of the mentioned questions have straight analytic answers, while the analysis leaves us with some additional puzzles regarding the importance of non-axisymmetry, at least at high altitudes.