ICTP DIPLOMA PROGRAMME IN EARTH SYSTEM PHYSICS 2015-16 SYLLABUS

Atmospheric Dynamics [15 lectures: 22.5 hours]

F. Kucharski

- Vorticity equation for synoptic-scale motion; potential vorticity conservation - Quasi-geostrophic motion; Thermo-Hydrodynamic equations in pressure coordinates - Rossby waves; free Rossby waves; forced Rossby waves - Baroclinic instability; two-layer model - Equatorial waves; Rossby-gravity waves; Kelvin waves - ENSO atmosphere and ocean feedback mechanisms; Gill model; Reduced Gravity Model - Boundary Layer Processes; turbulent fluxes; Ekman pumping - The General Circulation; Hadley Cell; Ferrell Cell - Tropical zonal and meridional circulations; Walker circulation; Sverdrup balance - Energetics of the General Circulation; Lorenz' energy cycle - Analysis of climate Variability; EOF analysis, PCA analysis, redictability analysis, Lorenz model, measures of predictability, signal, noise, theoretical limit of predictability