

ICTP DIPLOMA PROGRAMME IN EARTH SYSTEM PHYSICS 2013-14

SYLLABUS

CLIMATE DYNAMICS - {12 Lectures = 18 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, Gill model
- ENSO atmosphere and ocean feedback mechanisms; 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