

# **ICTP DIPLOMA PROGRAMME IN EARTH SYSTEM PHYSICS 2014-15**

## **SYLLABUS**

### **Atmospheric 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
- 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