2012-2013 ICTP POSTGRADUATE DIPLOMA PROGRAMME
EARTH SYSTEM PHYSICS

Specific Topics on Atmospheric Monitoring and Extreme Events (ESP-ST)
(12 lectures : 18 hrs)

Lecture 1.
Definition of instrumental meteorology. Need for measurements and basic variables for atmospheric science. Direct, indirect and derived measurements. Conceptual model of a general monitoring system.

Lecture 2
Pressure definition and measurements. Hydrostatic and hydrodynamic components. Hydrodynamic drag of precipitations and its role in deep moist convection development. Pressure fields beneath deep moist convection.

Lecture 3
Solar irradiance, and solar irradiance monitoring devices. Temperature definition and monitoring devices.Potential temperature and entropy. Virtual temperature.

Lecture 4
Wind field measurements. Mechanical, electronic and sonic anemometers. Points of strenght and weakness. Main flow, gusts and turbulence.

Lecture 5
Moisture measurements. Dew point and wet bulb temperature measurements. Psycrometric equation. Homogeneous and eterogeneous water condensation and its role in Earth-Sun energy budget. Experiments.

Lecture 6
Precipitation definition and monitoring devices. Rain gauges and disdrometers. Wind field and effects on rain measurements (side effect). Introduction to remote sensing and RADAR equation.