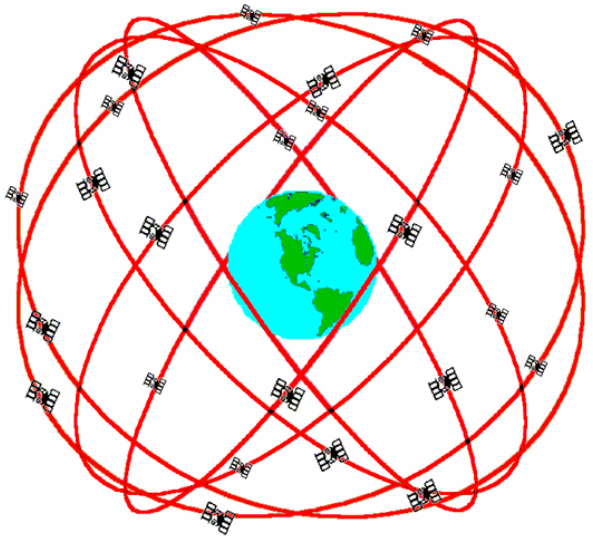
# GPS SURVEY OF THE EARTH'S ENVIRONMENT



## LAYERS

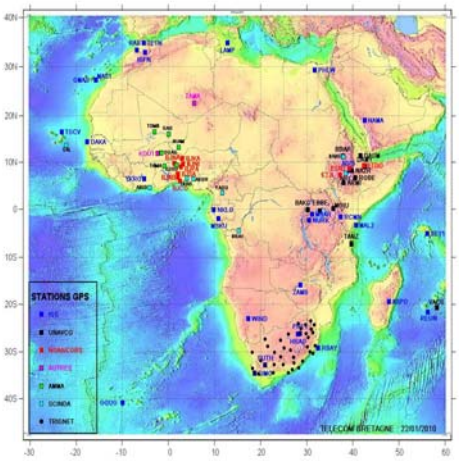
**> 600 km** **EXOSPHERE**
few collisions, Particles follow balistic orbit

**80-600 km** **THERMOSPHERE** -> Ionization by the solar X-EUV radiation **IONOSPHERE**

**30-80 km** **MESOSPHERE**
Absorption of the radiation UV by the ozone layer

**11-30 km** **STRATOSPHERE** Turbulence

**0-11 km** **TROPOSPHERE**
Meteorological phenomena

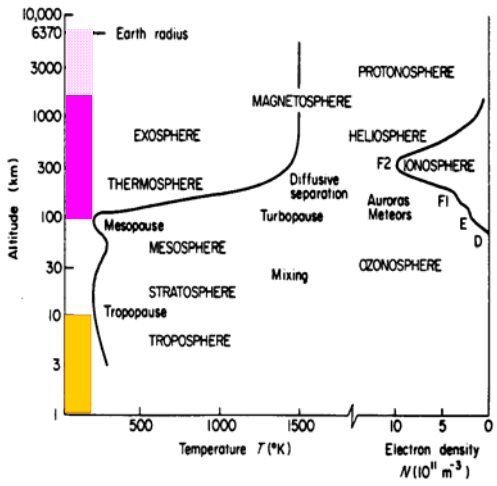



**GPS Network over AFRICA**

## PRINCIPLE

The GPS system is composed by a constellation of 24 satellites orbiting around the Earth (figure on the left side).
The signal emitted by each satellite is recorded by GPS receivers at the ground level. During the crossing of the layers surrounding the earth (figure below) the satellite signal is modified (fluctuations of the power, lengthening path, etc..). The 2 layers which strongly influence the signal are ionosphere and troposphere. The received signal processed gives access to parameters of these layers as :

- **the total electron content (ionosphere)**
- **scintillation index (ionosphere)**
- **the water vapour ( troposphere)**

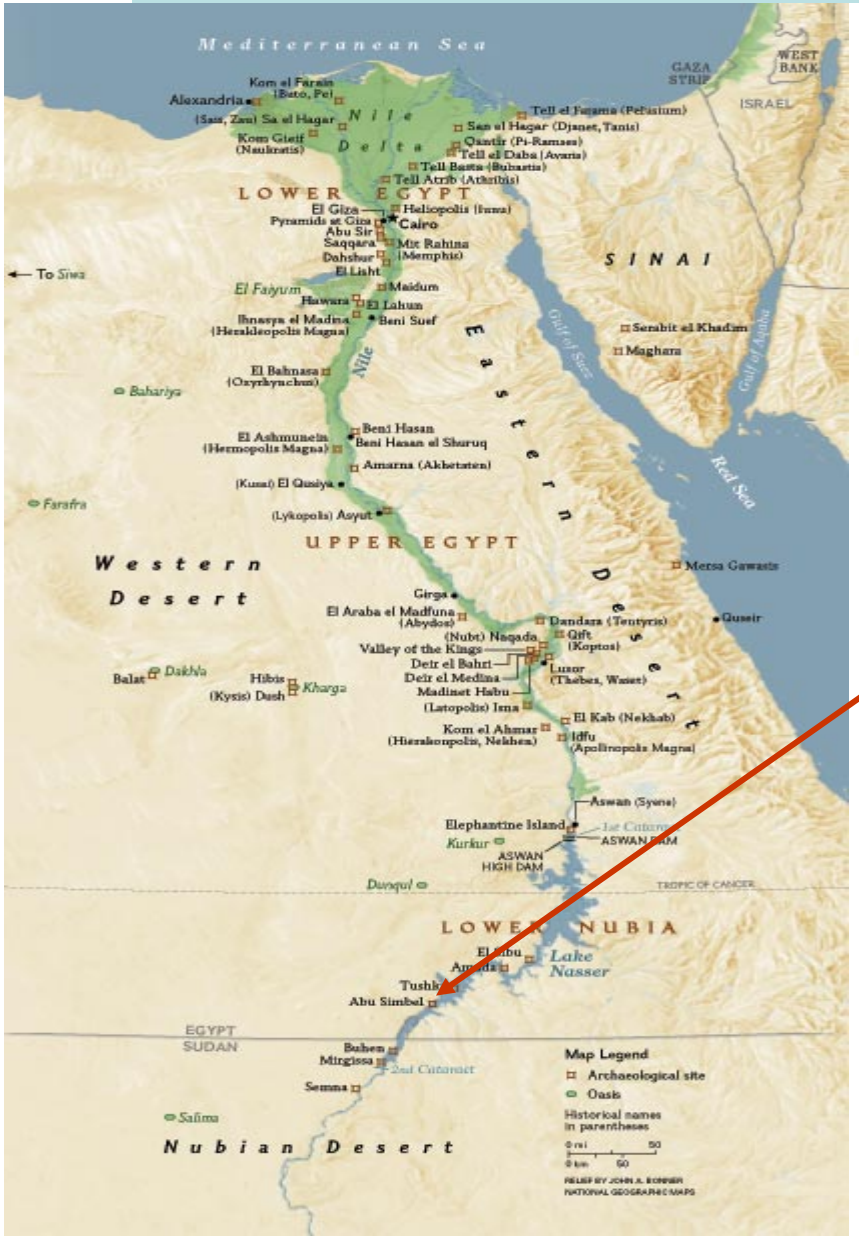



## PROJECT

### MONITORING OF THE WATER VAPOUR IN THE TROPOSPHERE ALONG THE NIL

**By using GPS and meteorological stations located in the different countries along the Nil, we can survey the water vapour and develop climatic studies of this area.**
**In the international programme ISWI (International Space Weather Initiative), the deployment of GPS receivers over Africa is planned.**
**Therefore it is a necessity to organize training school for the use of GPS data.**

# Location





**Abu Simbel**

## AIM OF THE PROPOSAL

The dramatic change from the abundant rainfall in the 1950s and 60s to much drier conditions from the 70s to the 90s over most of the African countries was the strongest trend in rainfall on the planet of the 20th century. Marked inter-annual variations in recent decades have resulted in extremely dry years with devastating environmental and socio-economic impacts. With a large rural population depending on rain fed agriculture, the abrupt decrease of water resources has been devastating to both populations and economies.

The aim of our proposal is to provide the decision makers with improved assessments of similar rainfall changes which are likely to occur during the 21st century due to natural fluctuations and as a result of anticipated global climate change. An essential step in that direction is to improve our ability to forecast the weather and climate in the east Mediterranean region specially Egypt.

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