Seasonal effects on Laser, GPS and Absolute Gravimetry vertical positioning at the OCA-CERGA geodetic station, Grasse (FRANCE)

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Objectives

•**Monitoring** the vertical displacements of the Grasse fundamental geodetic observatory

•**Comparing the time series** of 3 independent geodetic techniques

Satellite Laser Ranging (SLR)

GPS

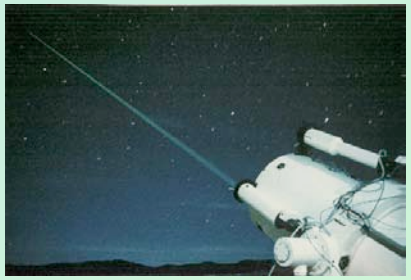
Absolute Gravimetry (A.G.)

•**Comparing the observations with geodynamical models** of the different loading effects to better understand the annual signal

6-year time series spanning 1998-2003

Data

5 years of SLR time series



- LAGEOS-1 and -2 satellite monthly combined solution
- **Standard deviation of the vertical component: 3 mm**

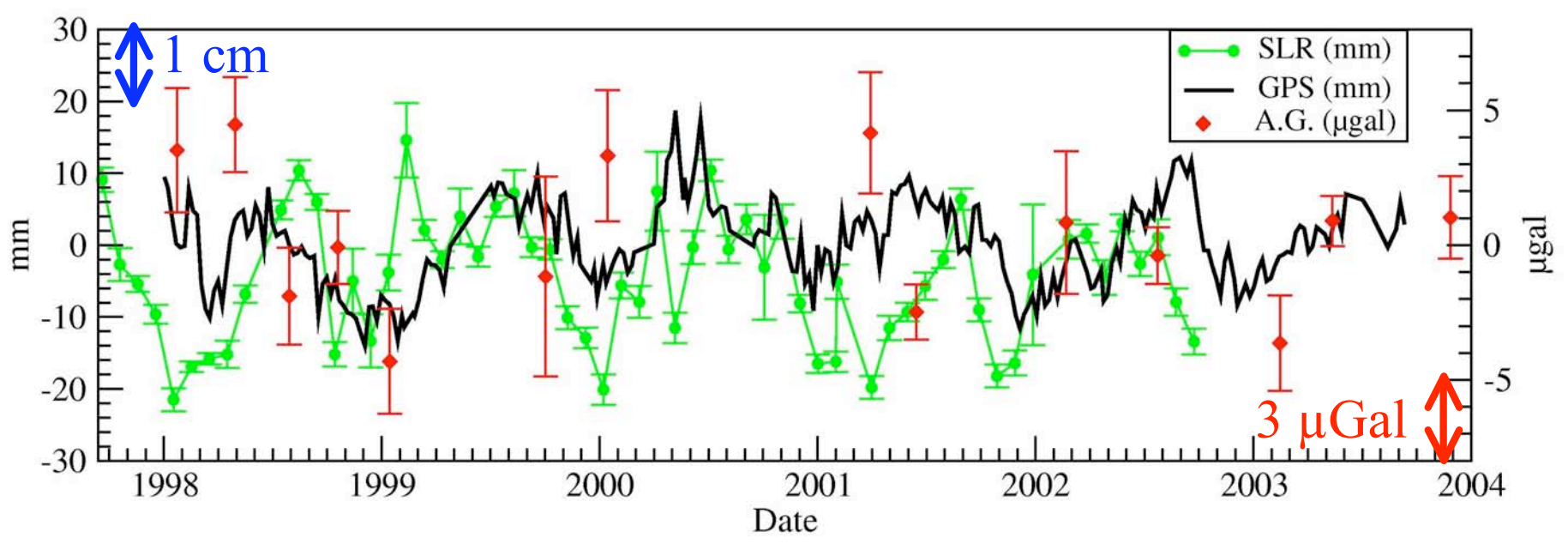
6 years of GPS time series

- Weekly CODE (Centre for Orbit Determination in Europe)
- **Standard deviation on the vertical component : 4 mm**

14 A.G. campaigns

- **FG5 accuracy 1-2 µGal**
- Corrections for earth tides, ocean loading, polar motion, and local atmosphere effects (- 0.3 µGal / hPa due to loading and to mass attraction)

Six years results



- Both SLR and GPS time series of the vertical component show a significant annual signal

- Non linear least squares algorithm to search for periodical signal :
  - Amplitude : 5.5 mm (GPS) – 6.1 mm (SLR)
  - Phase : maximum near July