

What is PSMSL?

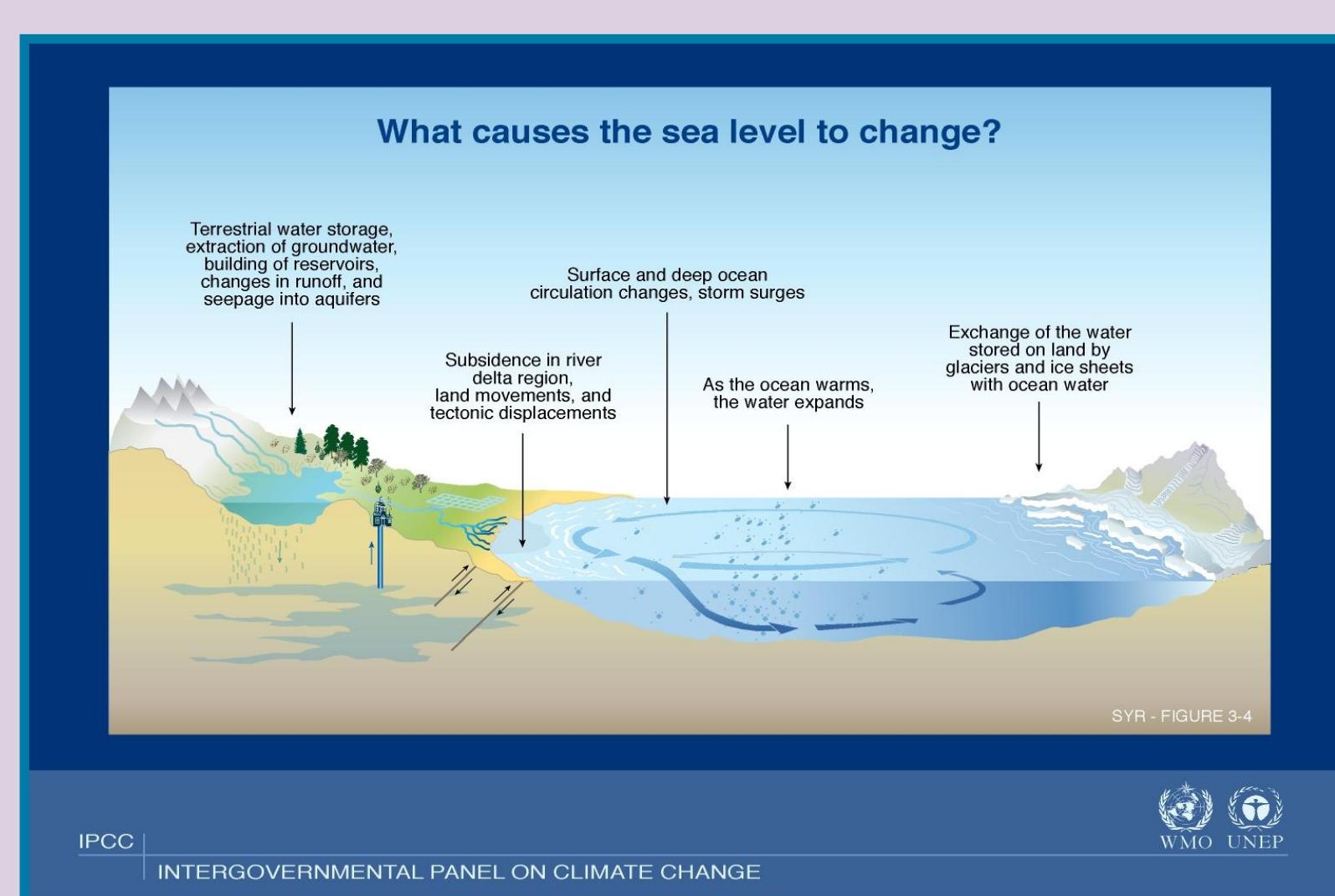
A little history . . .

Since 1933, the Permanent Service for Mean Sea Level (PSMSL) has been responsible for the collection, publication, analysis and interpretation of sea level data from a global network of tide gauges. It is based at the Proudman Oceanographic Laboratory (POL), Bidston Observatory which is a component of the UK Natural Environment Research Council (NERC). The PSMSL is supported by the Federation of Astronomical and Geophysical Data Analysis Services (FAGS), the Intergovernmental Oceanographic Commission (IOC) and NERC.

What Causes Sea Level Rise?

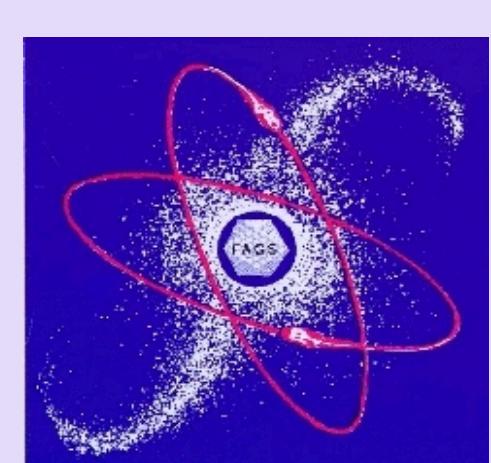
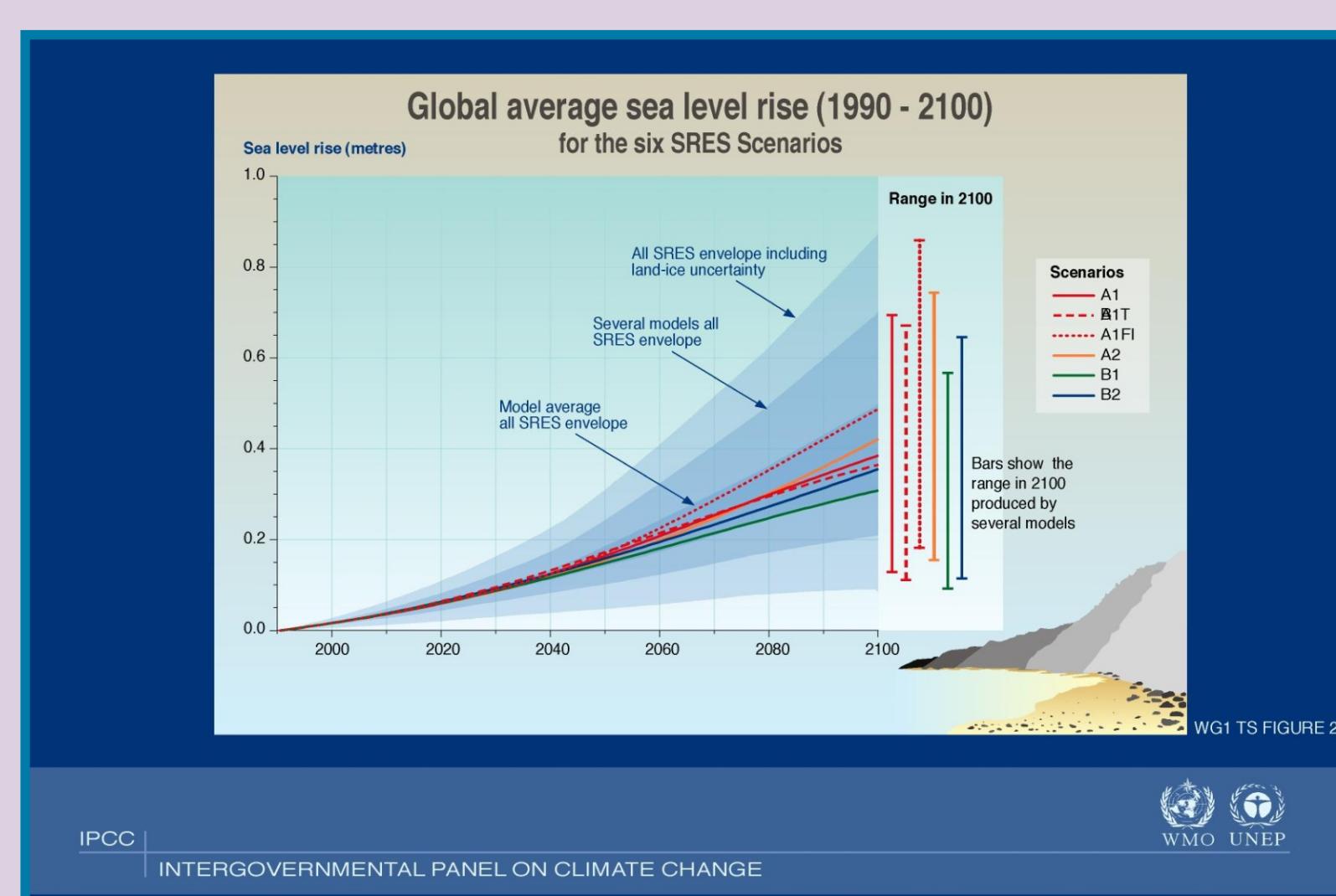
On the time-scale of decades to centuries, sea level rise is caused by:

- Thermal expansion
- Ice melt
- Ground water changes
- Changes in ocean circulation



Future sea level rise

The IPCC Third Assessment Report includes projected scenarios for sea level rise over the coming century. The central value of the scenarios projects a global average sea level rise of 0.48m between 1990 and 2100.



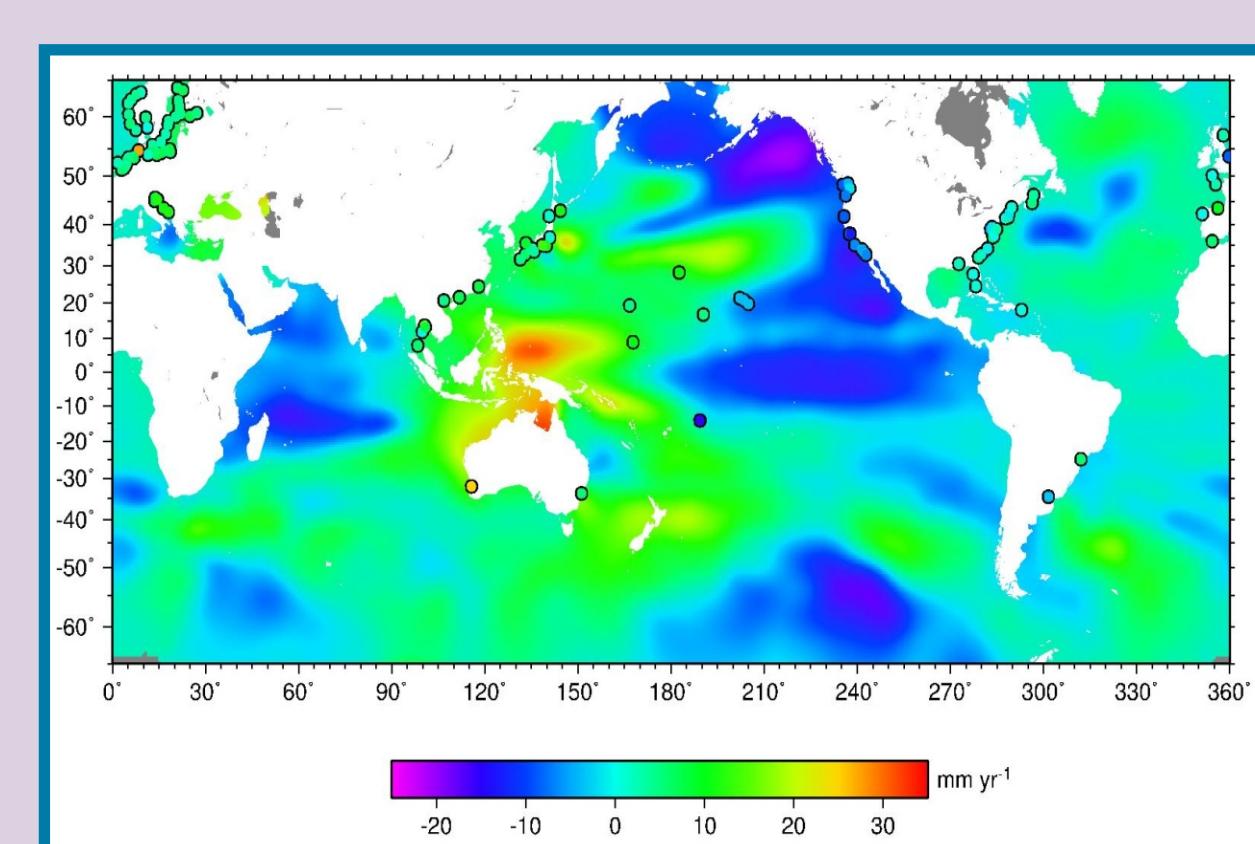
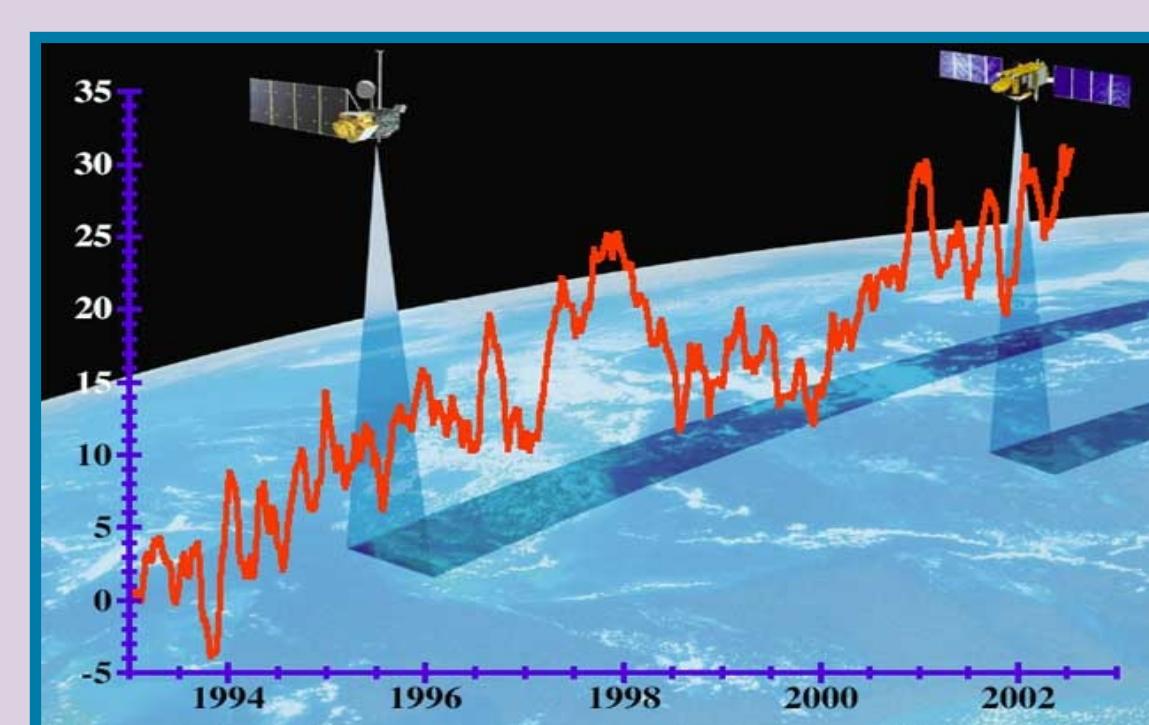
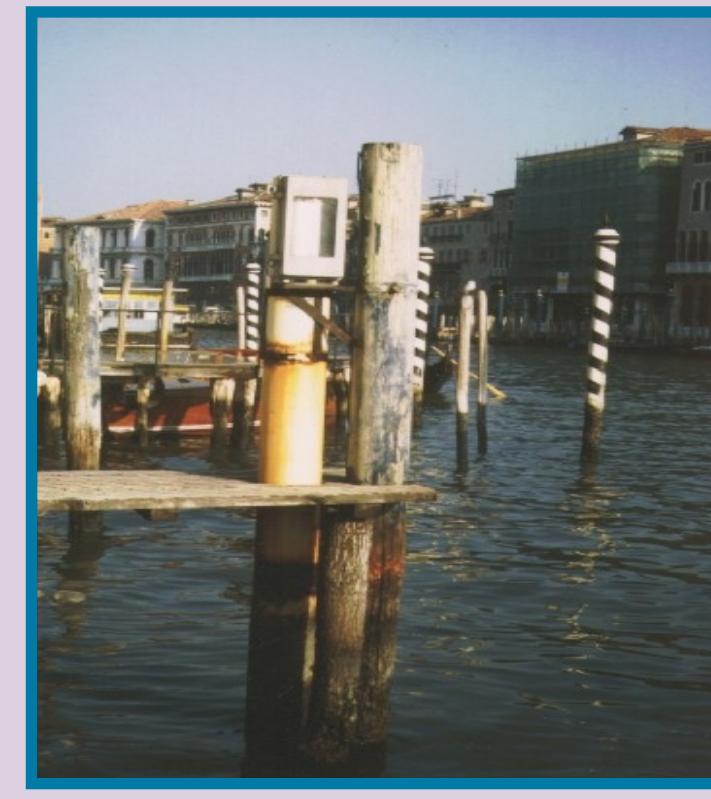
The PSMSL is a member of the Federation of Astronomical and Geophysical Data Analysis Services (FAGS) which was formed by the International Council of Scientific Unions (ICSU) in 1956.

Measuring Sea Level

The data provided to the PSMSL comes from a global array of tide gauges, like the one in Venice shown to the right.

Increasingly sea level is also measured from space by satellites like Topex/Poseidon and Jason-1.

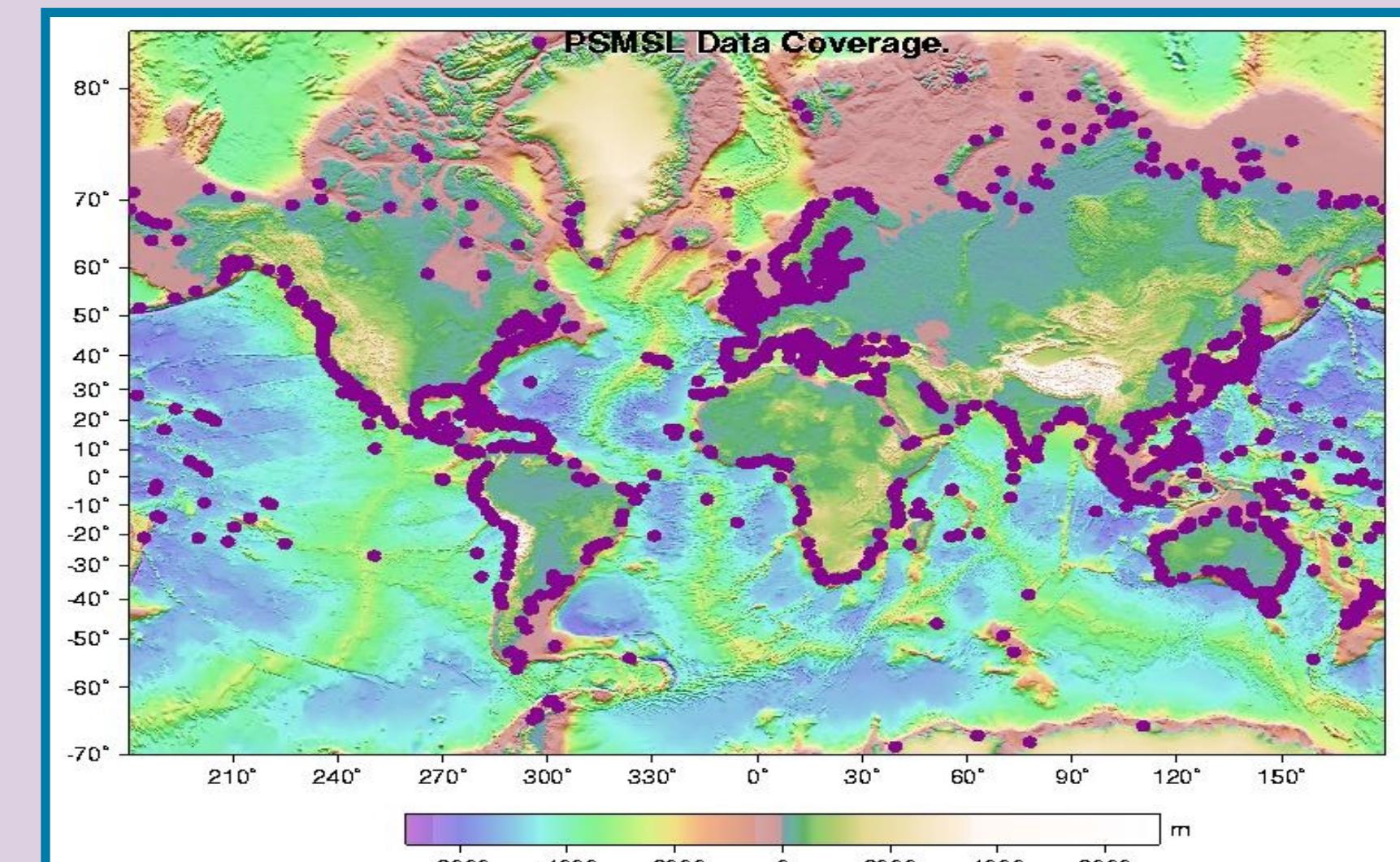
Tide gauges are used to calibrate and check trends measured by the altimeters. The tide gauges provide "ground-truth".



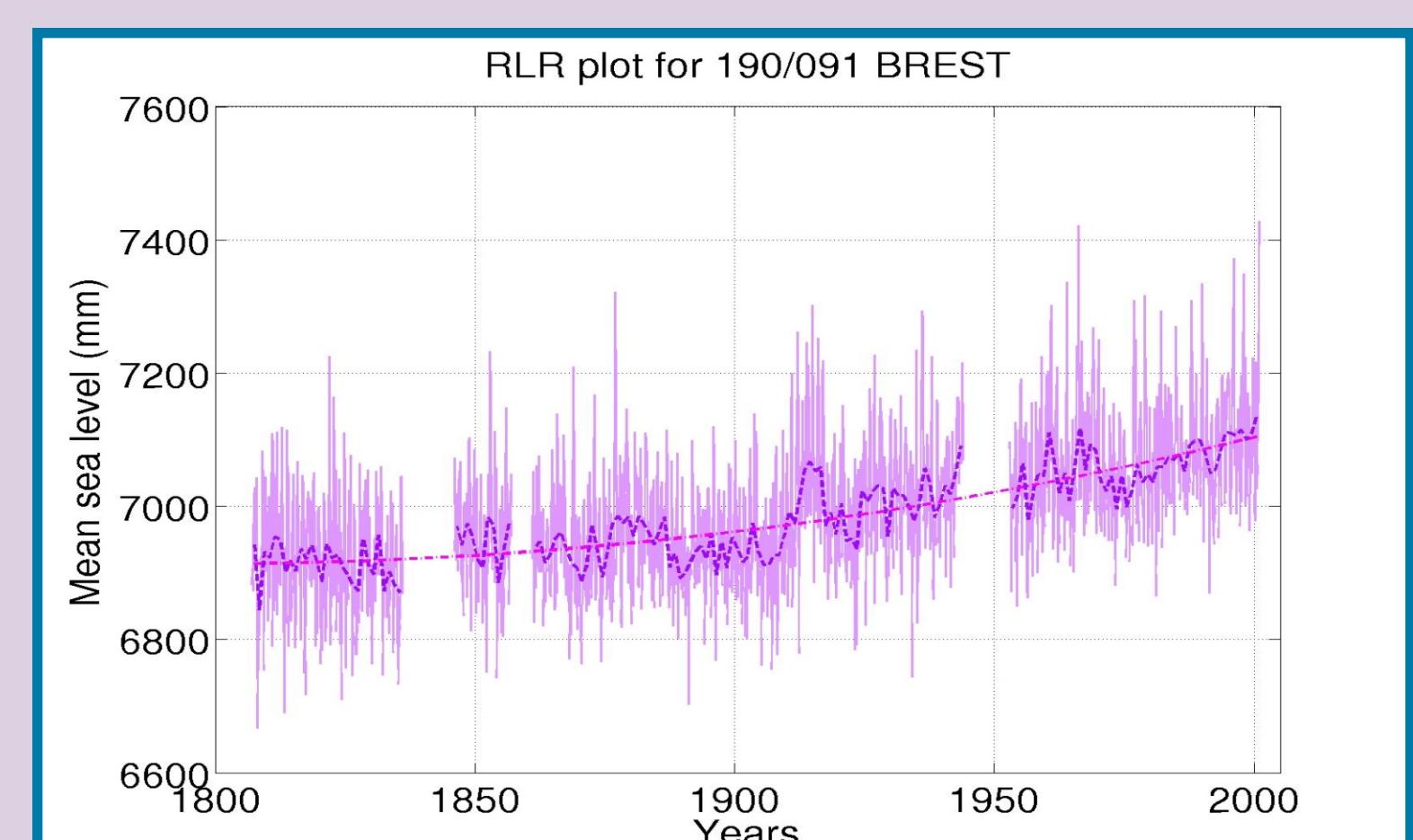
The circles shown here on the left are trends over the last 10 years from high quality tide gauge records in comparison with satellite derived values.

Data Coverage

At the last update, the PSMSL database contained over 52,000 station years of data from 1,952 stations around the world.



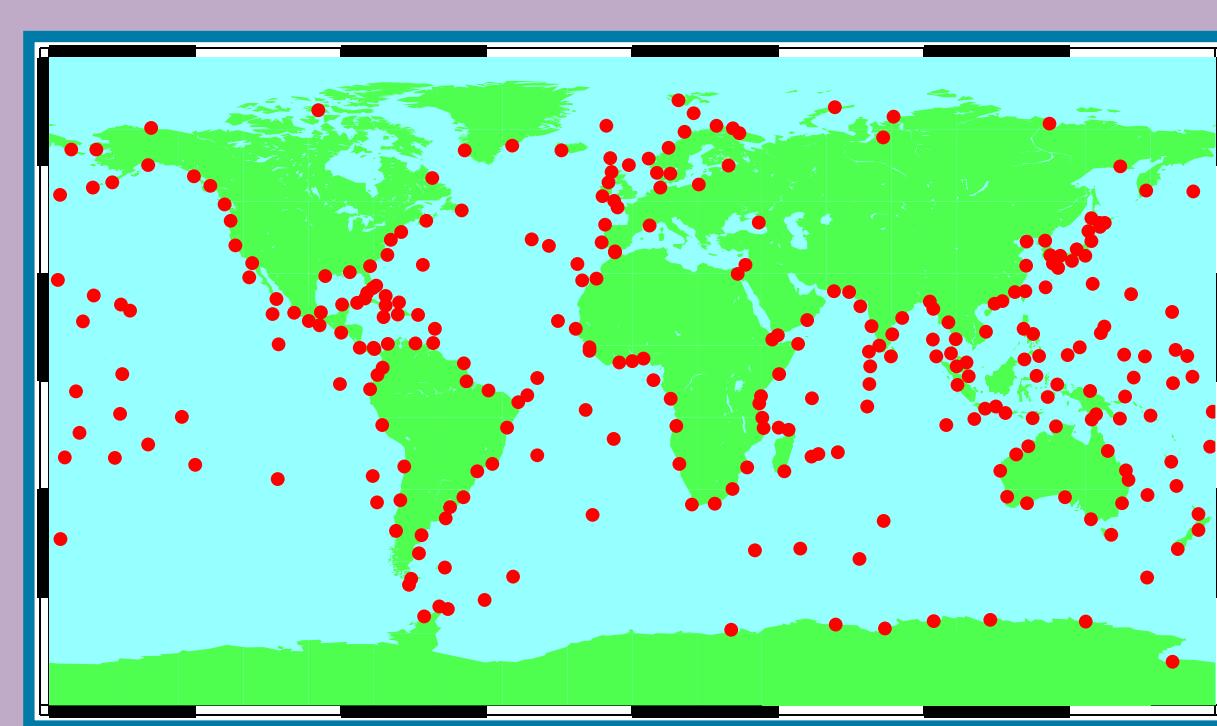
The longest record in the database is from Brest and began in 1807. The oldest British record is from Liverpool beginning in 1858 though we have a record of high waters since 1768.



The longest sea level record in the world is from Stockholm which began in 1774. However, the oldest record is from Amsterdam and began in 1700 but ended in 1925 following construction works. Both these records are available from the PSMSL but are not officially included in the database as their quality is variable.

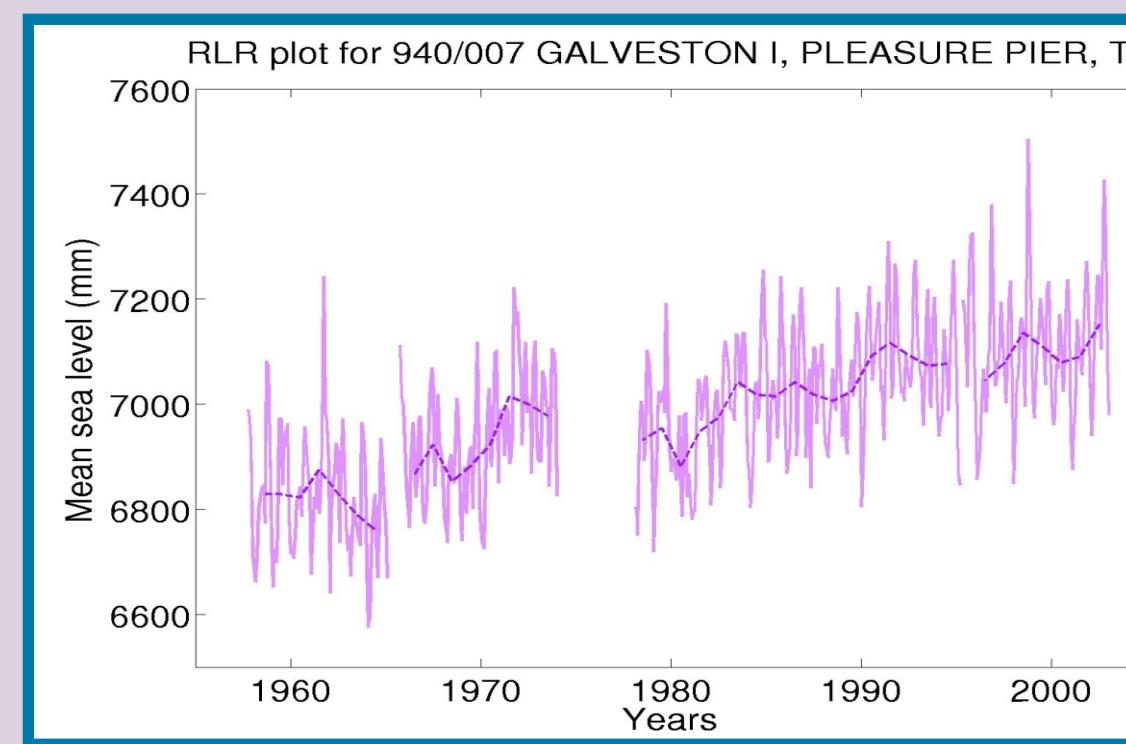
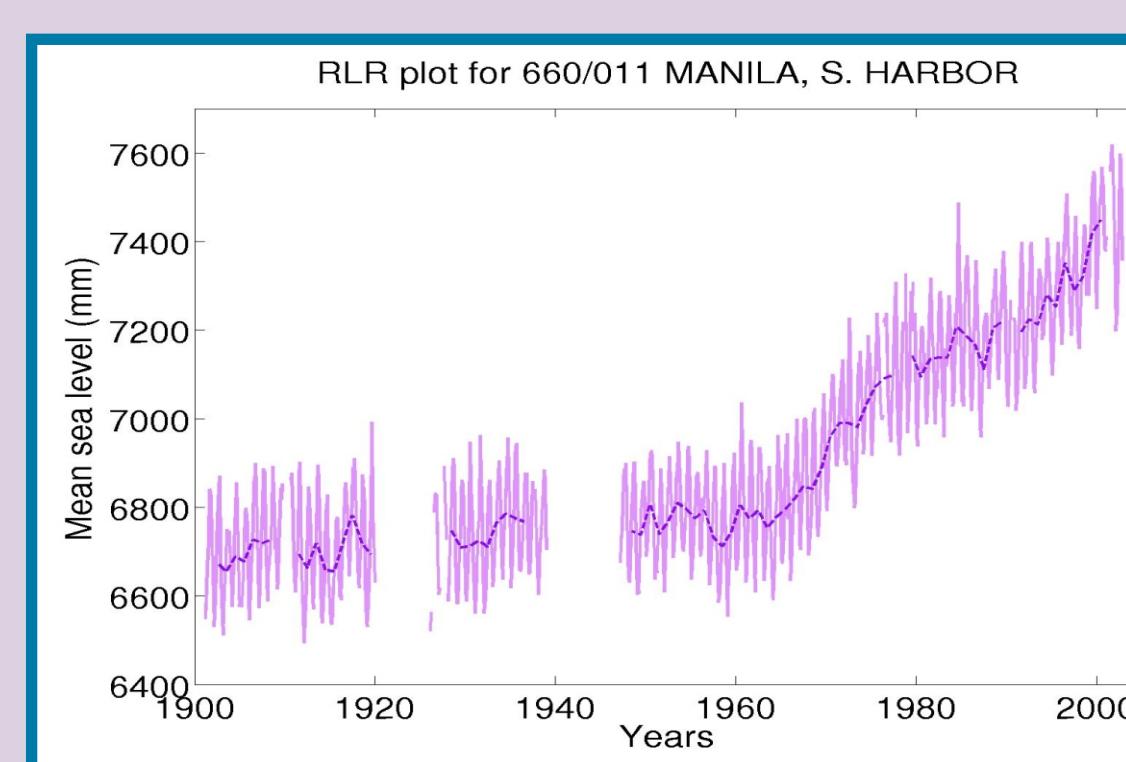
The IOC GLOSS Programme

- The Global Sea Level Observing System became known as GLOSS as it provides data for deriving the 'Global Level of the Sea Surface'
- It aims at the establishment of high quality global and regional sea level networks for application to climate, oceanographic and coastal sea level research.
- **GLOSS will help to expand to the PSMSL database:**
- The main component of GLOSS is the 'Global Core Network' of 290 sea level stations around the world for long term climate change and oceanographic sea level monitoring.



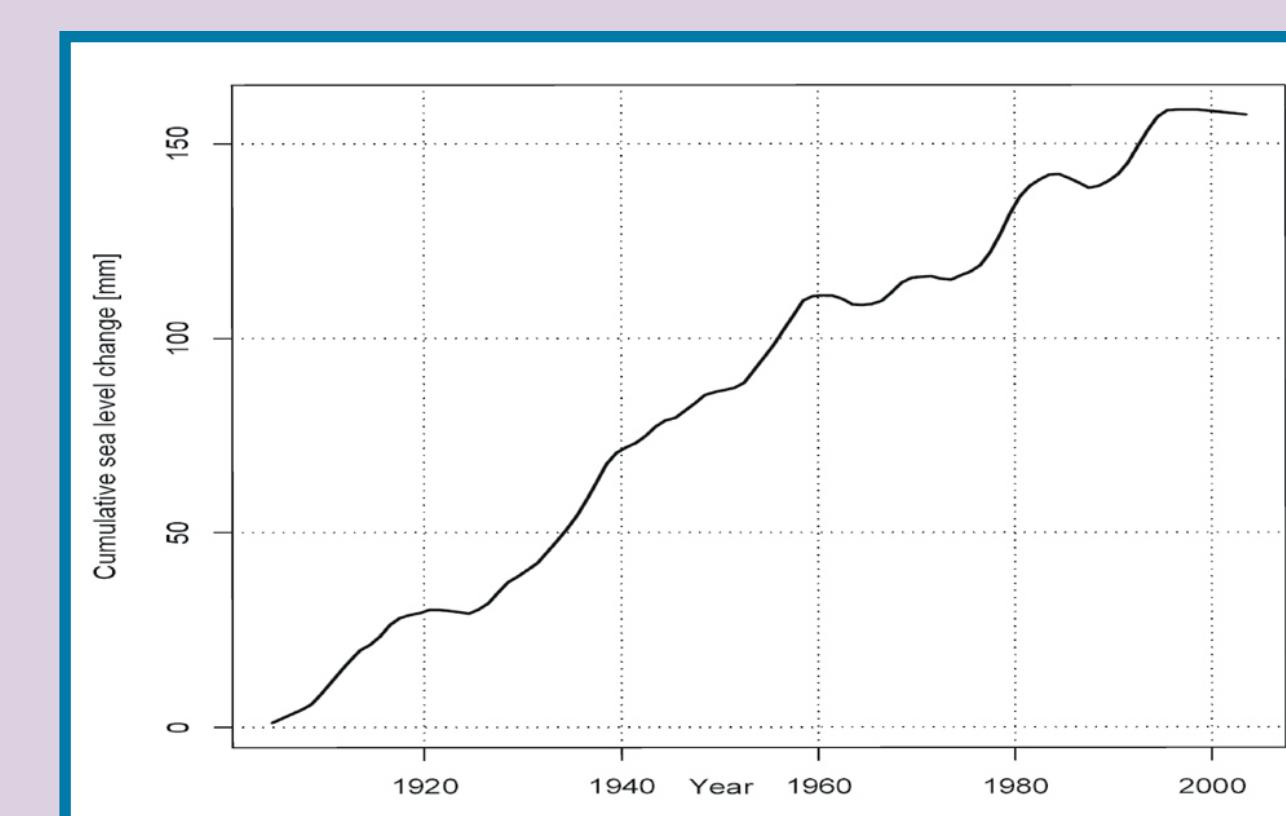
Vertical Land Movements (VLM)

Vertical land movements can arise from earthquakes, Glacial Isostatic Adjustment (GIA) following the melting of ice sheets from the last Ice Age, or changes in water storage. Terrestrial water storage can be changed by extraction of ground water, building reservoirs and altering surface runoff. In places such as Manila, Philippines, or Galveston, USA, ground water extraction has been causing the land to sink, further increasing the effects of sea level rise.



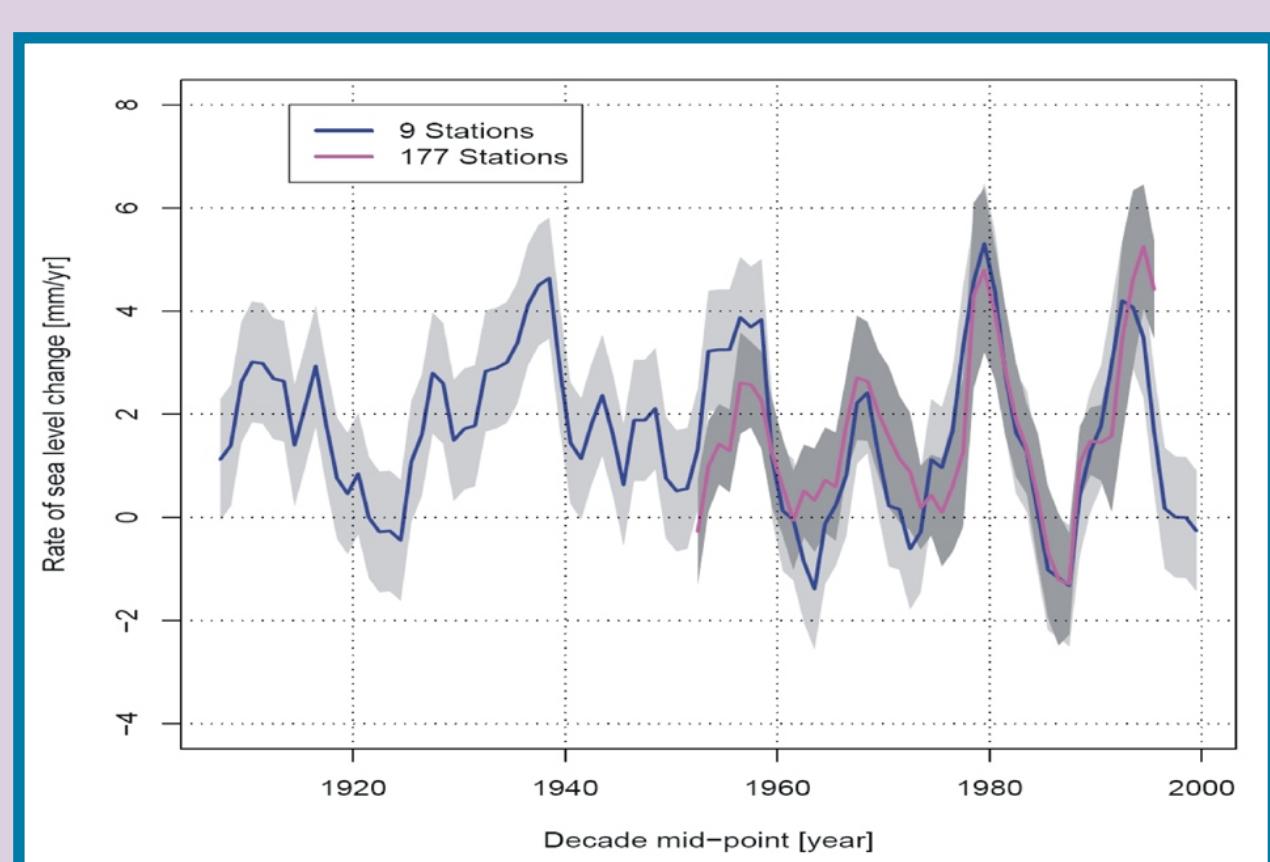
Current Research

The PSMSL actively exploits the sea level dataset to gain further insight into sea level changes.

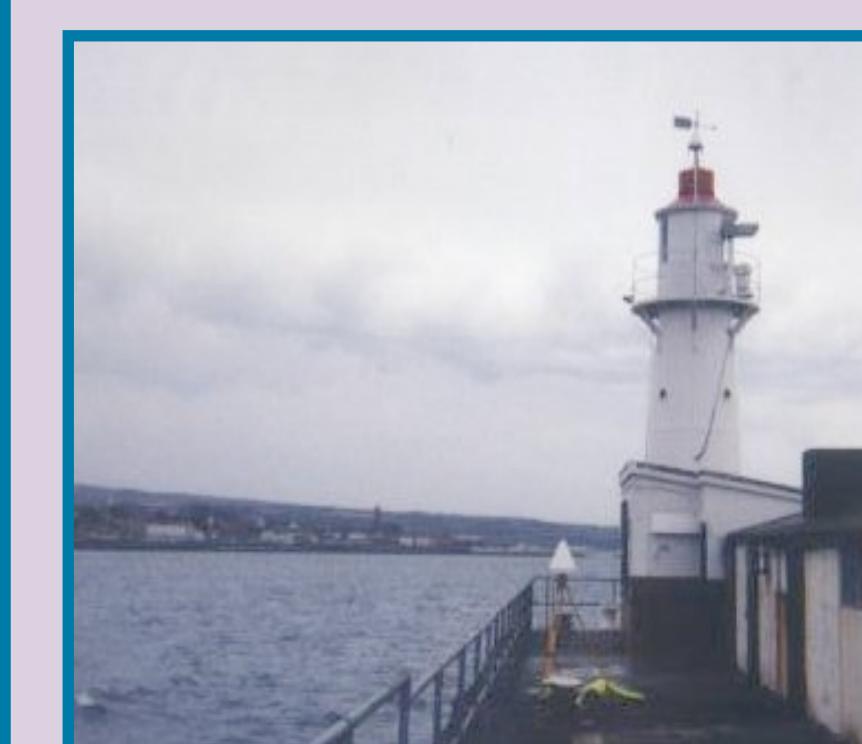


Current research is exploring trends in global sea level to look for evidence of an acceleration in sea level rise.

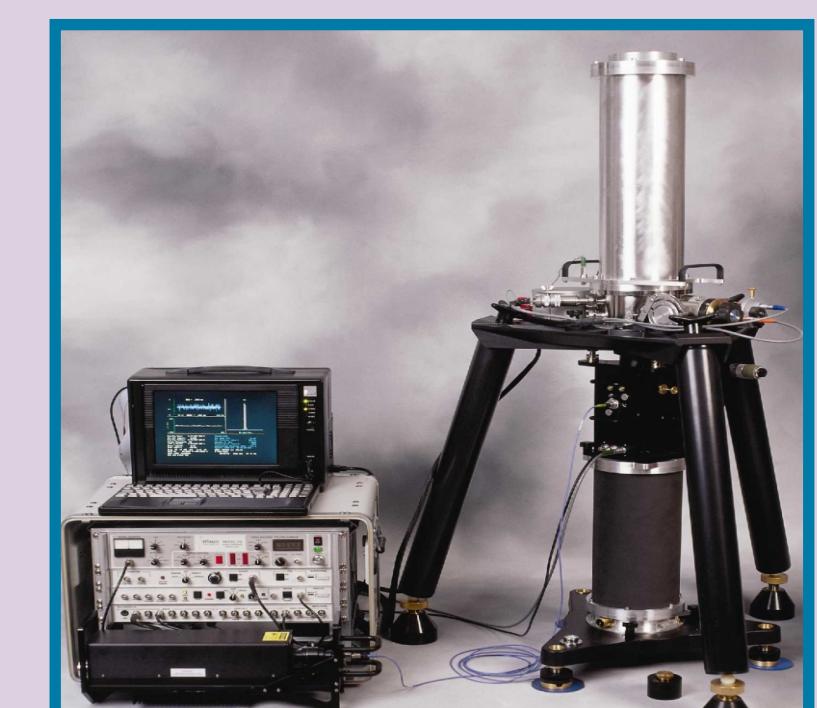
The large spatial scale of sea level variations means that an estimate of the rate of change of global sea level can be made using only a few high quality station records, which has allowed us to extend our studies back to the beginning of the 20th century.



Measuring VLM



At tide gauge sites, Global Positioning System (GPS) equipment is usually used (shown here at Newlyn). Other systems for measuring VLM include the French DORIS system which has global coverage but is less precise.



Vertical land movement can also be measured using Absolute Gravity instruments, like the one owned by POL shown here. These are very expensive and only a few exist.