

The Global Sea Level Network

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What Do We Want?

- **Measure sea level change accurately**
- **Measure over the long term**
- **Over all time-scales**
- **Everywhere** e.g. **Deep ocean**
High latitudes
At the coast where people live

What do Tide Gauges Offer?

- **Continuity e.g. changes in MSL and extremes**
- **Accuracy**
- **All timescales**
- **High latitudes (even under ice)**
- **Straits and other confined areas**
- **Coastal**

For altimetry:

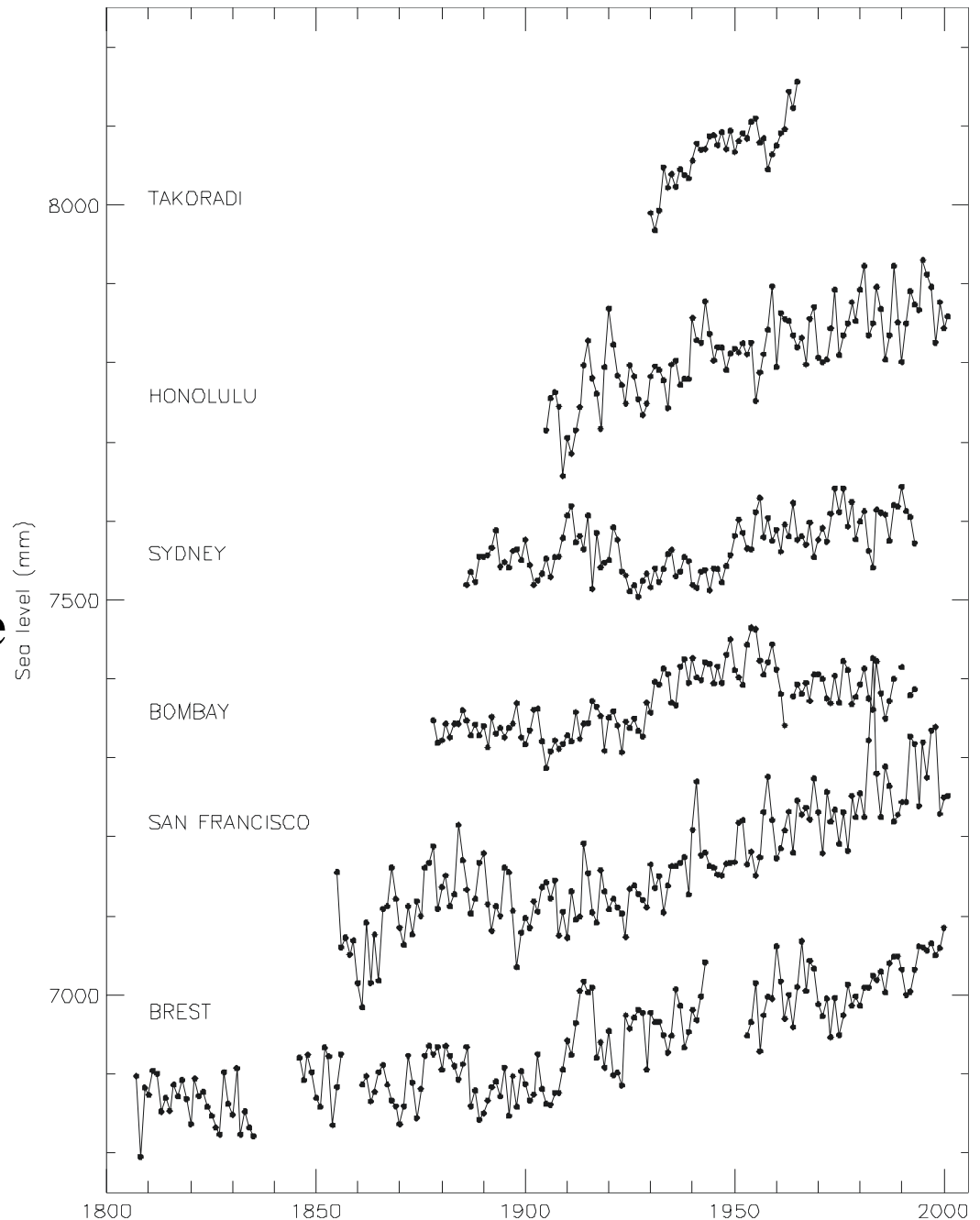
- **Calibration system**
- **Back up system when/if altimeter coverage fails**

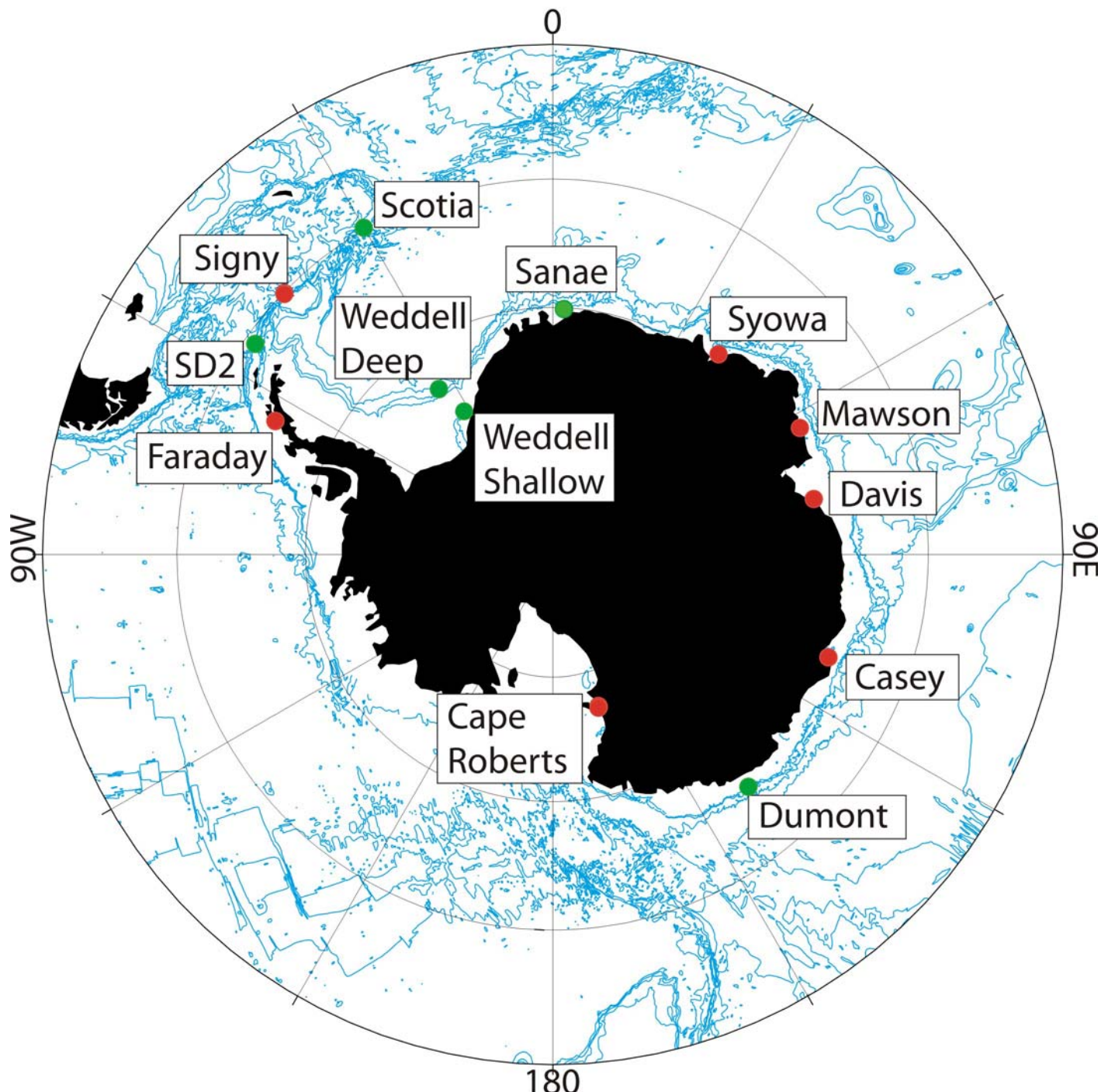
Global Sea Level Change

Long records from each
each continent
(from PSMSL data bank)

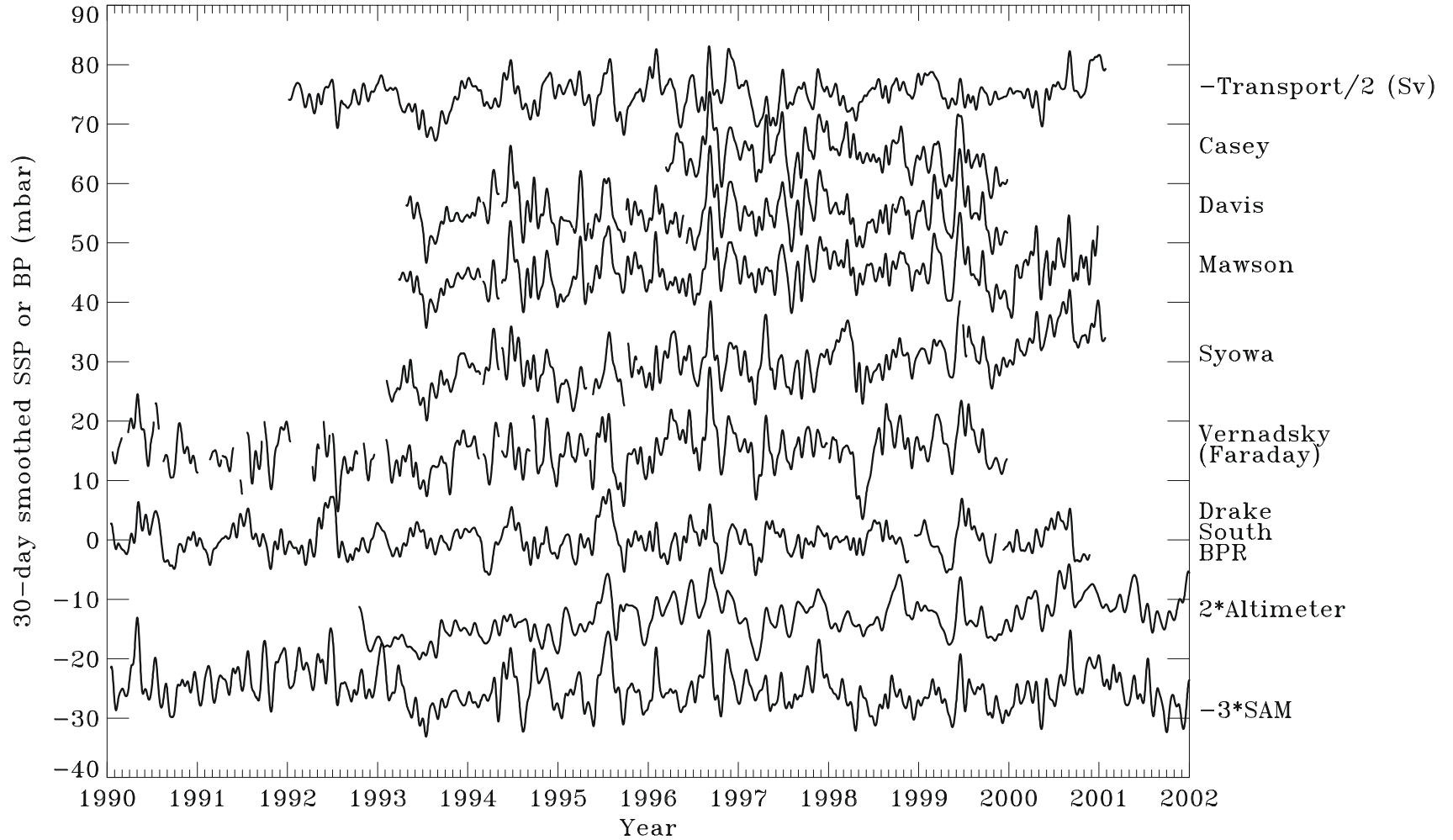
Most records show evidence
for rising sea levels during
the past century

IPCC concluded that there
has been a global rise of
approximately 10-20 cm
during the past 100 years

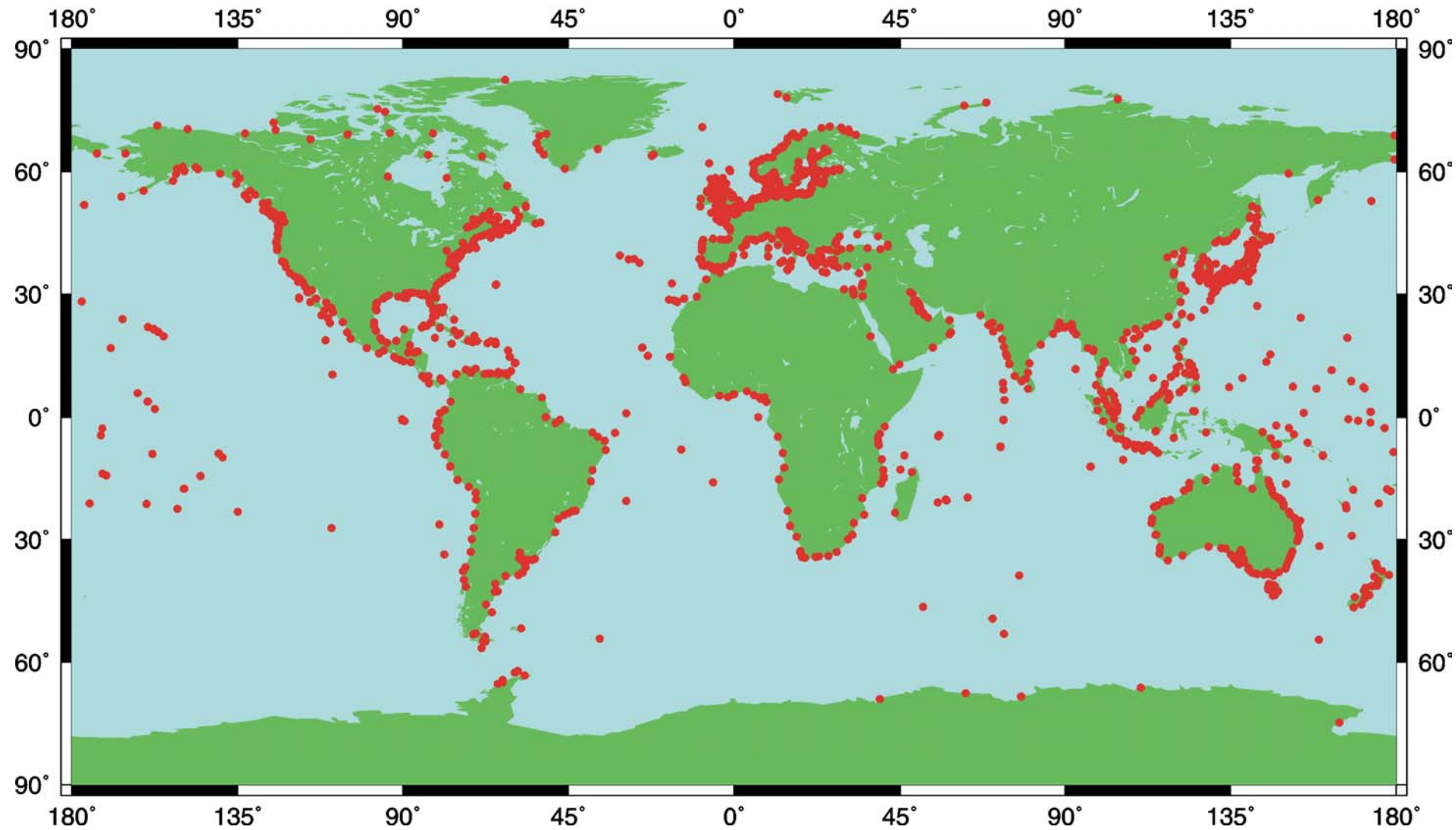




Deseasonalised Antarctic time series



Distribution of PSMSL Stations



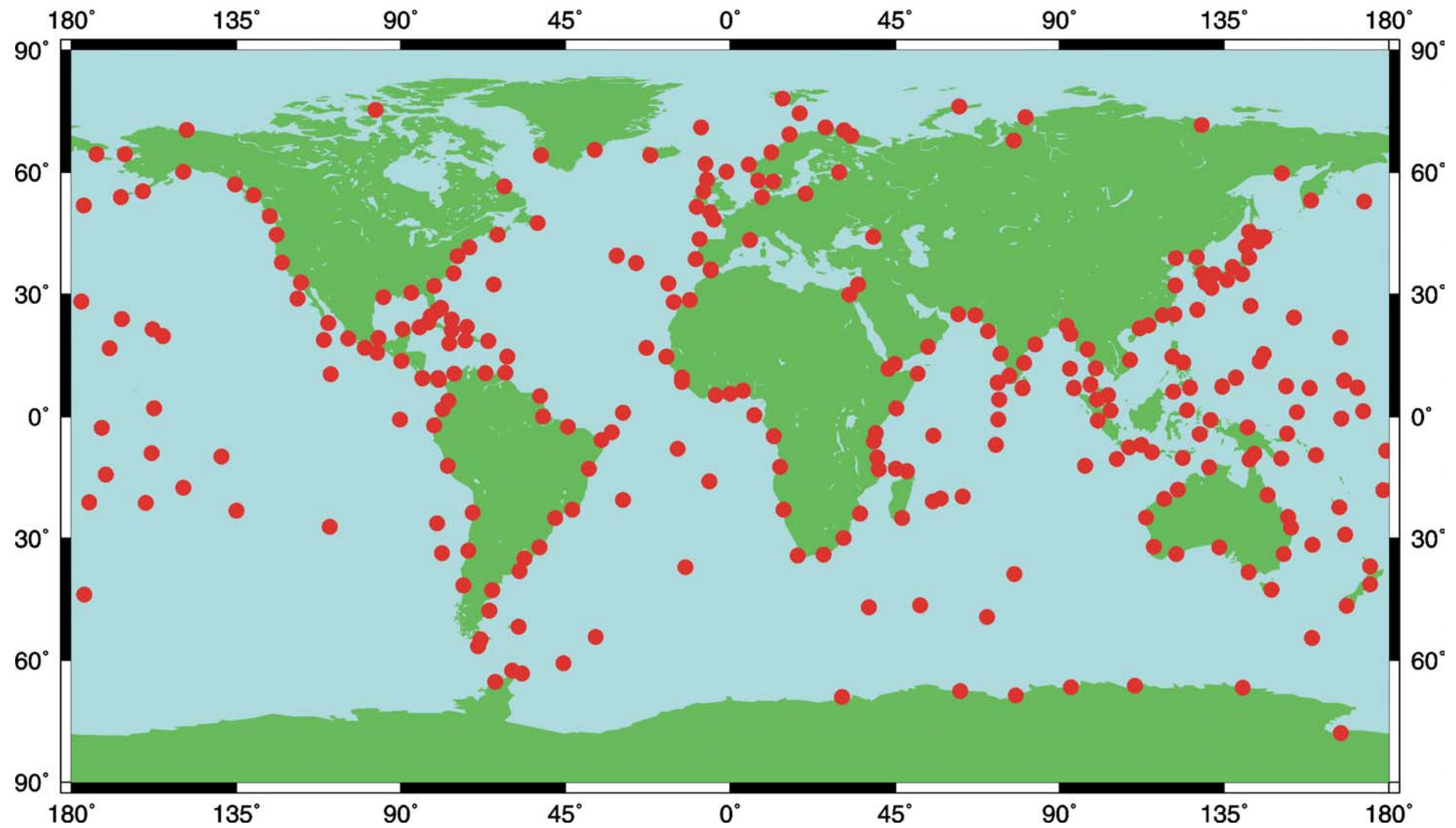


GLOSS
Global Sea Level Observing
System of JCOMM
(IOC/WMO)

The GLOSS Programme

- **Original aim : Development of GLOSS Core Network of 300 sea level stations for range of ocean/climate science and practical applications.**
- **Global select set of gauges spaced 500-1000 km apart. Geographically balanced. Open ocean locations. Best technology.**
- **Smaller set than PSMSL but high quality and long term.**

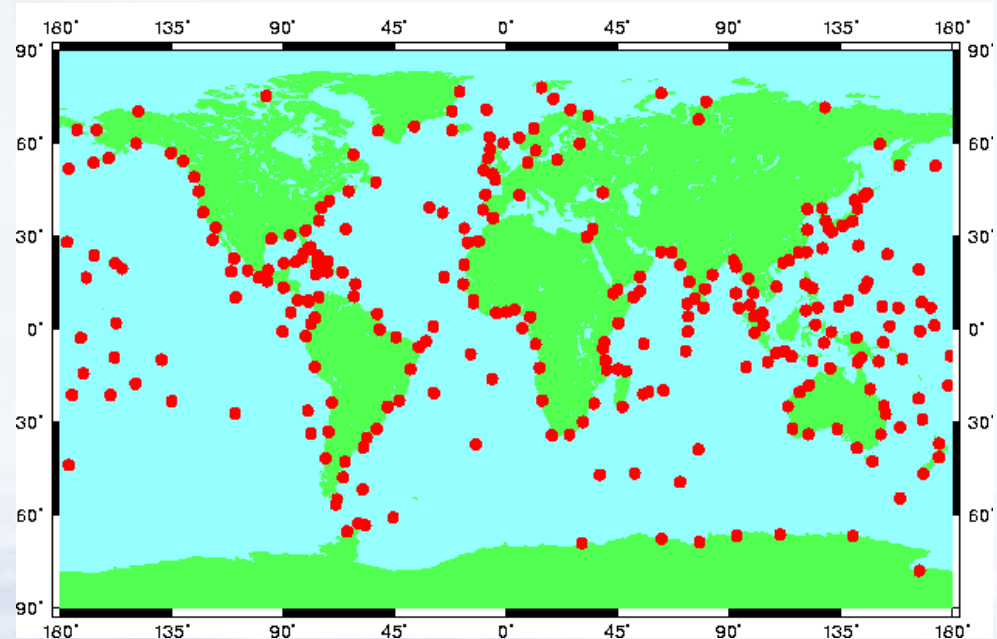
GLOSS Core Network defined by GLOSS02





The GLOSS Programme/Networks

- **GLOSS Core Network (GCN)**
- **Regional Densifications of the GCN**
- **Long Term Trends (LLT)**
- **Altimeter calibration (GLOSS-ALT set)**
- **Ocean Circulation (GLOSS-OC set)**



GLOSS Core Network (GCN)

SUMMARY OF GLOSS STATUS IN GLOSS ADEQUACY REPORT (2003) (IOC/INF-1190)

GLOSS is far harder work than altimetry:

- **GLOSS needs active cooperation with individuals and governments in many Member States**
- **Altimetry needs “just a satellite, a rocket and a few workstations”**
- **Keep these things in mind when progress in tide gauge networks sometimes seems slow**



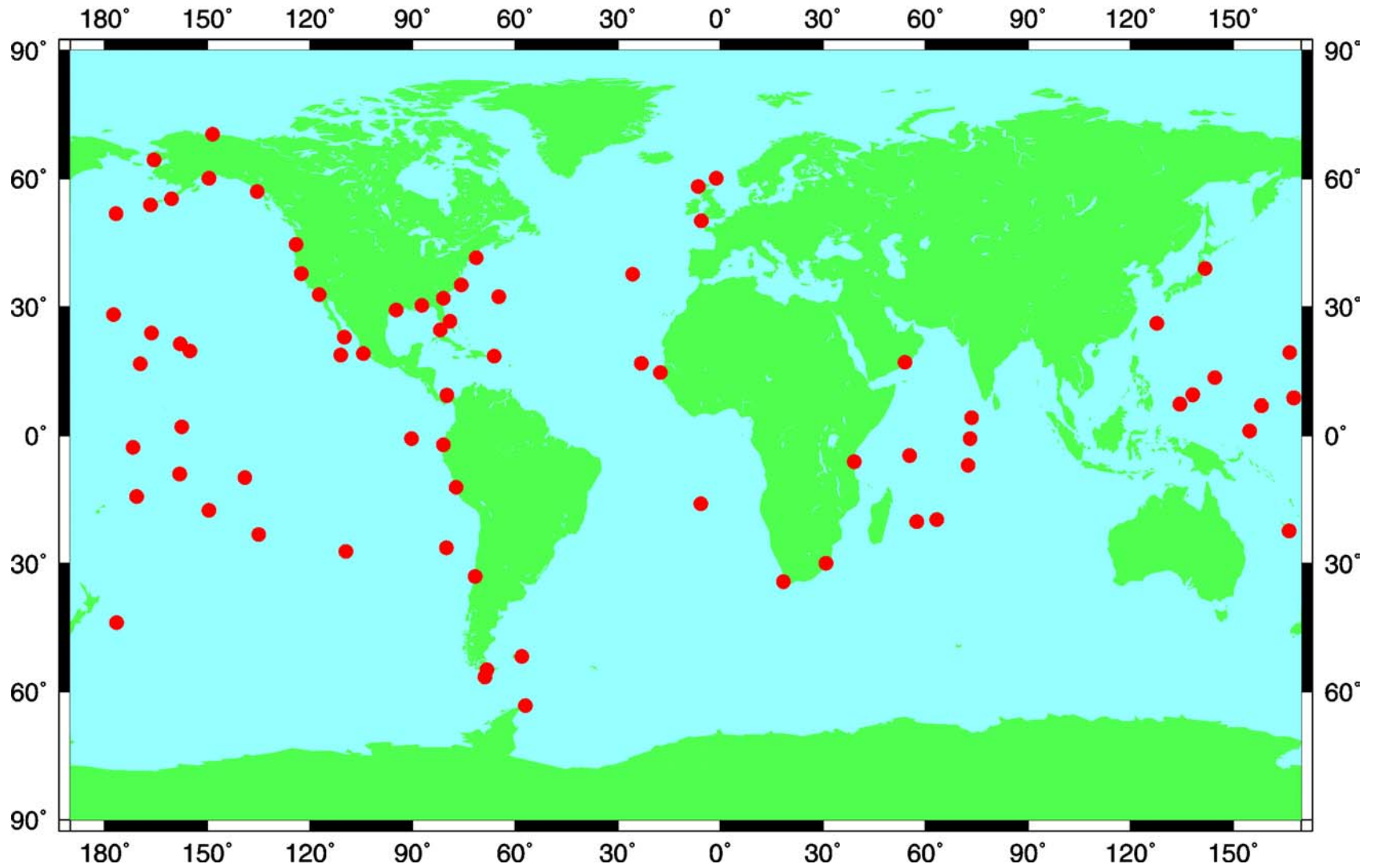
Since the GLOSS 1997 Implementation Plan, the main development has been the demand for **Fast** data for:

- Operational assimilation of data into deep ocean models in GODAE (**'Fast' = 2 days, maybe 1 week**).
- Operational assimilation into coastal models e.g. storm surge, upwelling applications (Coastal GOOS) (**'Fast' = few hours**)
- Satellite altimeter calibration (**'Fast' = 1 week**)
- Better tide gauge operations as faults can be identified and fixed sooner (**'Fast' = 1 day**). The need for Fast data coincides with the need for general GLOSS modernisation.



**GLOSS Fast data can be obtained from the
GLOSS Fast Centre at the
University of Hawaii Sea Level Center**

GLOSS Real Time Stations (April 2003)



QUESTION ABOUT THE GLOSS-ALT CALIBRATION COMPONENT

→ **GLOSS Has Provided the Network for Altimeter Calibration** – Can the Mechanisms for Ongoing Calibration be made more ‘Official’ or ‘Automatic’

SOME GLOSS PROSPECTS

→ **October Technical Workshop** - cheaper, accurate, user-friendly devices e.g. radar gauges

→ **International Funding Possibilities**

→ **Expansion of Coastal as well as the Climate/Ocean Elements of GLOSS** - consistent with GCOS Adequacy Report, COOP Strategic Plan and GTOS Coastal Plan

→ **Complementarity of GLOSS and Altimetry** – ESA, NASA and CNES funding towards GLOSS training courses and outreach

→ **Therefore, I am optimistic about the future network**



CONCLUSIONS

- **Global tide gauge network should improve in coverage and accuracy in next few years.**
- **We have to monitor using both systems, understand and predict (? Ocean insight into GCM development.)**
- **If gaps in altimetry, GLOSS has to be capable of describing the main components of global sea level variability in the meantime (Chambers et al, Church et al).**
- **Calibration system using gauges needs to be 'formalised'**
- **Need for more combined products**