Global Sea Level Observing System (GLOSS)

Keith Thompson (Dalhousie)
Thorkild Aarup (IOC)

keith.thompson@dal.ca
t.aarup@unesco.org

Why Measure Sea Level?

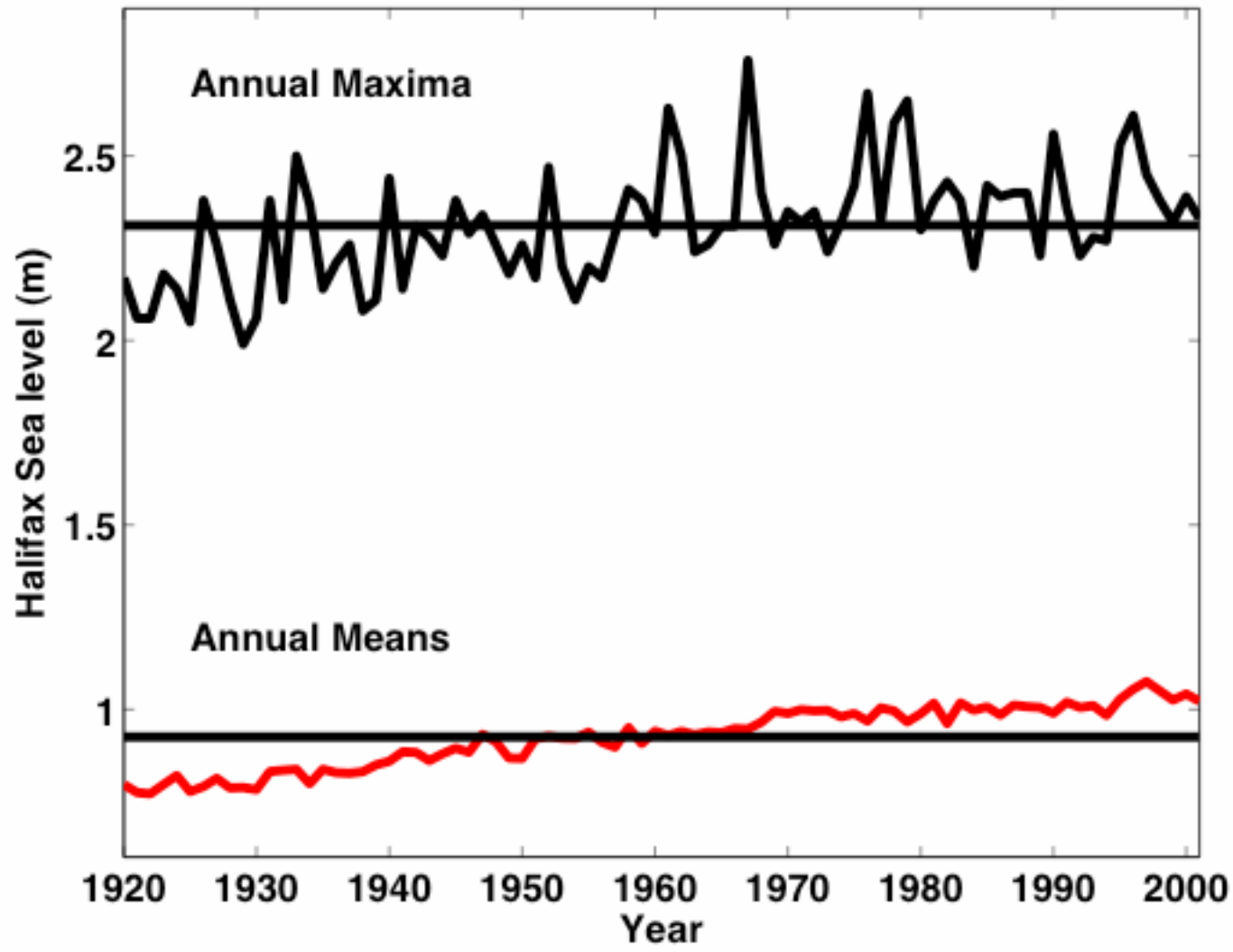
- Practical applications e.g define vertical datums, safe navigation, constrain models, predict flood risks
- Coastal management e.g. sea level used to understand past and future changes in shelf and ocean conditions

Maldives Int. Airport

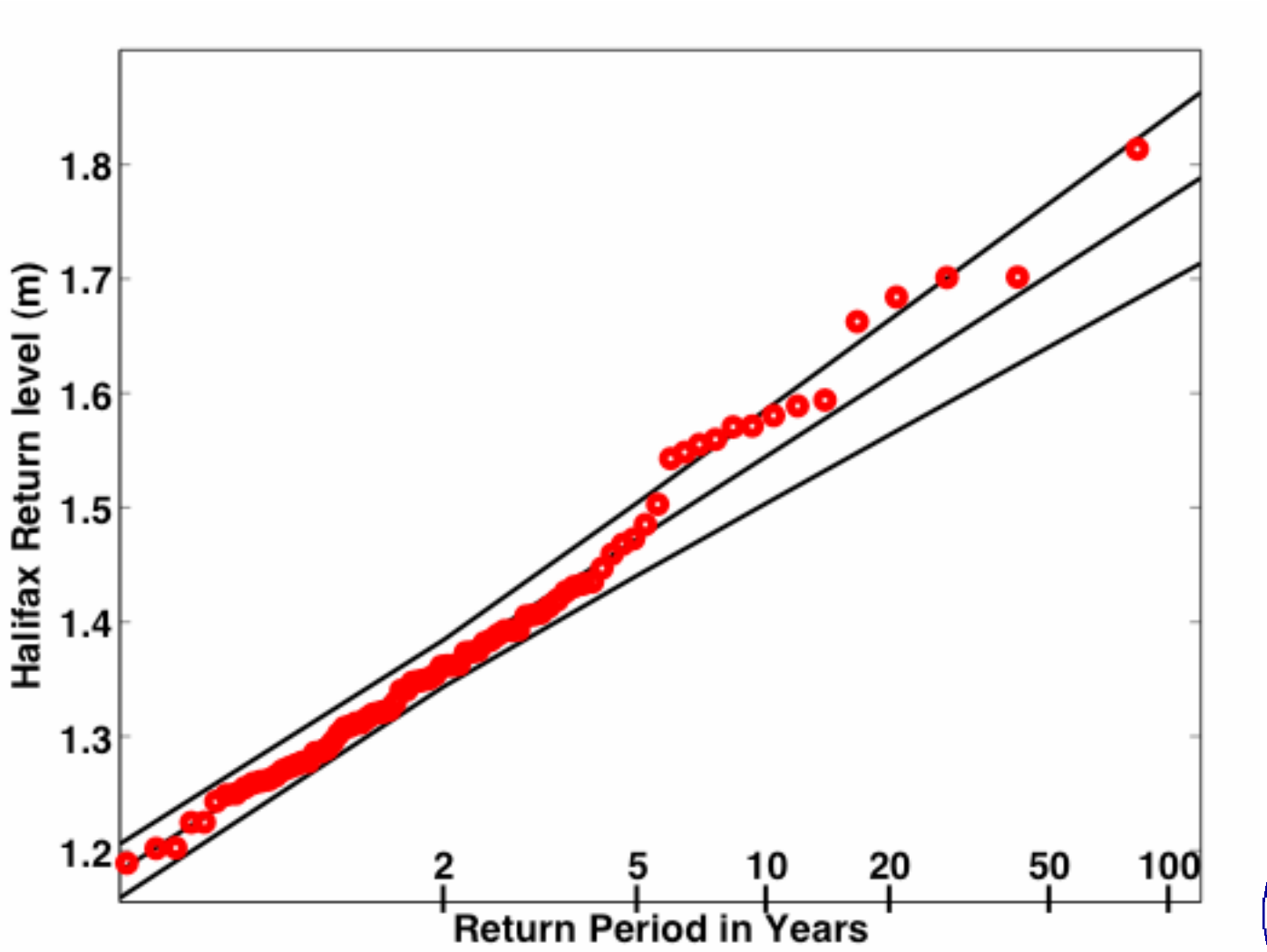
Time-Scales and Causes of Sea Level Change

- Seconds to minutes: waves, tsunamis
- Hours to days: tides and surges
- Seasonal: surface heating and freshwater input
- Interannual: ENSO, NAO
- Long term trends: climate variability and change, vertical crustal movement (e.g. GIA)

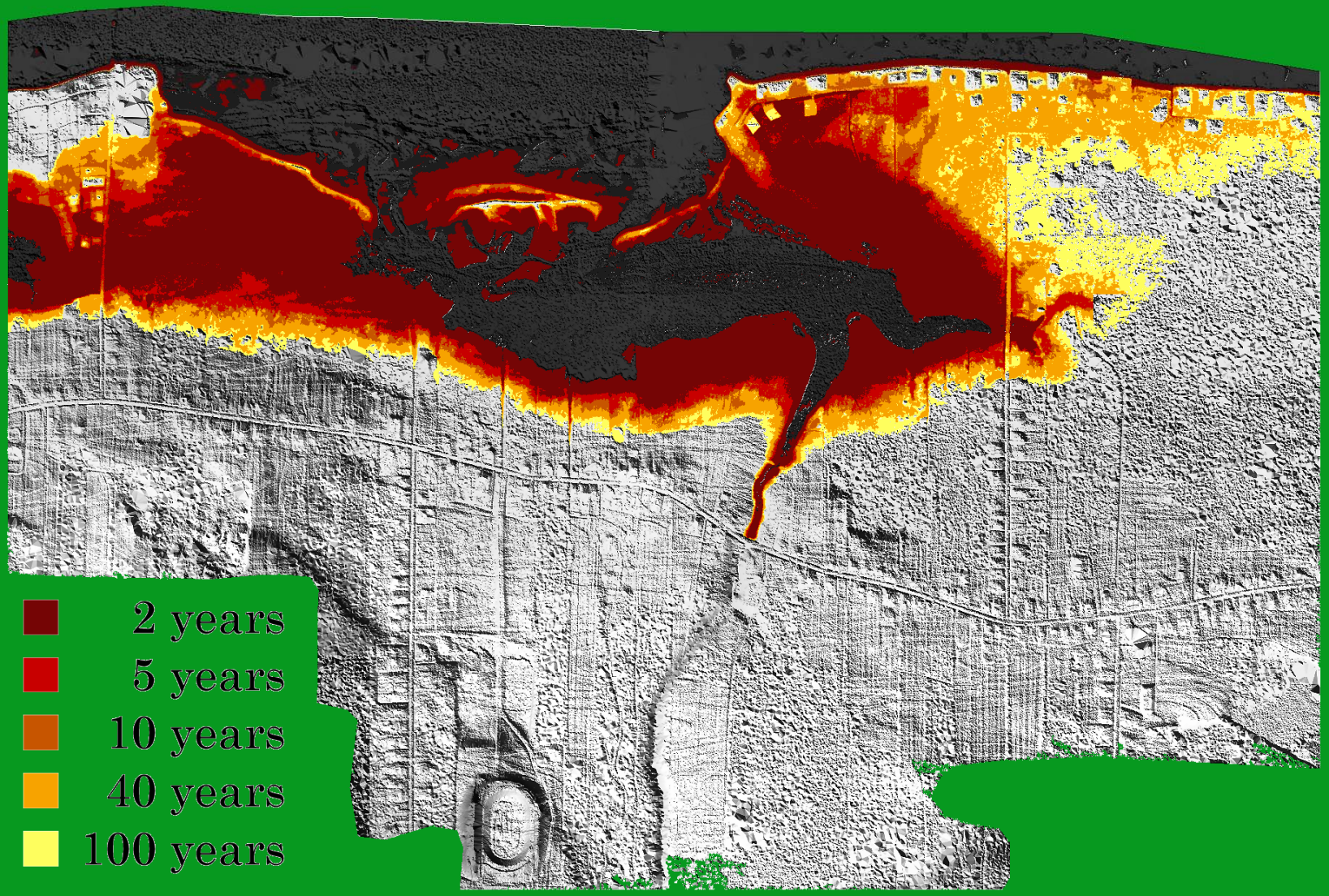
80y of Observed Sea Level at Halifax



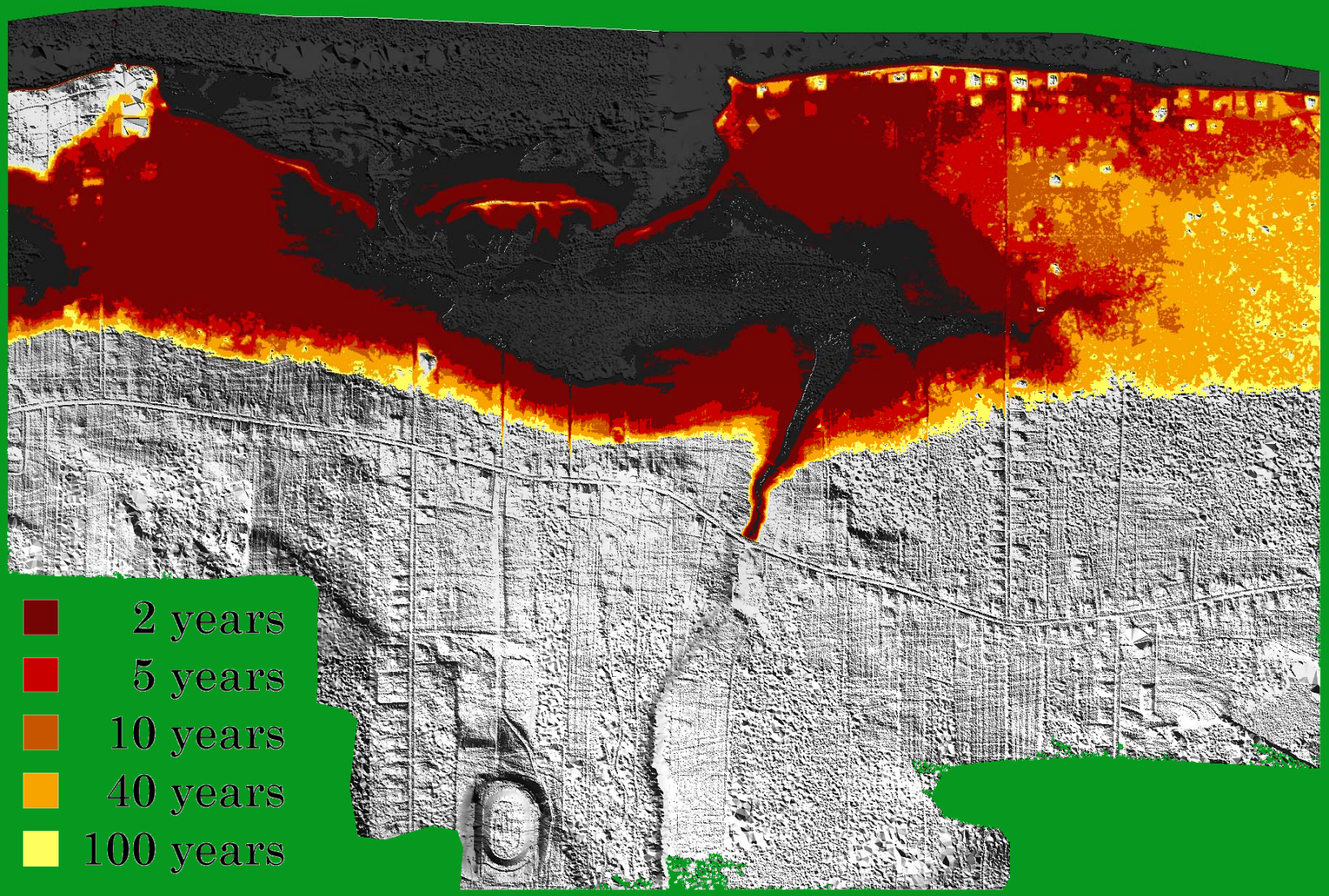
Long Sea Level Records Allow Us to Make Plots Such As ...



Present Day Flooding Risk
Near Shediac, NB, Canada



What Will it Be Like Next Century?



Expect present 100y return level to be breached every 10y in 100y

What is GLOSS?

- Established by IOC in mid-1980s to improve quantity and quality of sea level data sent to PSMSL and other sea level centres.
- Original aim: Develop GLOSS Core Network of 300 sea level stations for practical and ocean/climate science applications.
- Global array of gauges spaced 500-1000 km apart. Geographically balanced. Open ocean locations. Best technology.

What Data Streams Does GLOSS Generate?

1. Delayed mode: QC'd mean sea levels to PSMSL

2. Delayed mode: QC'd higher-frequency data (e.g. hourly) to GLOSS Data Centre (PSMSL, UHSLC)

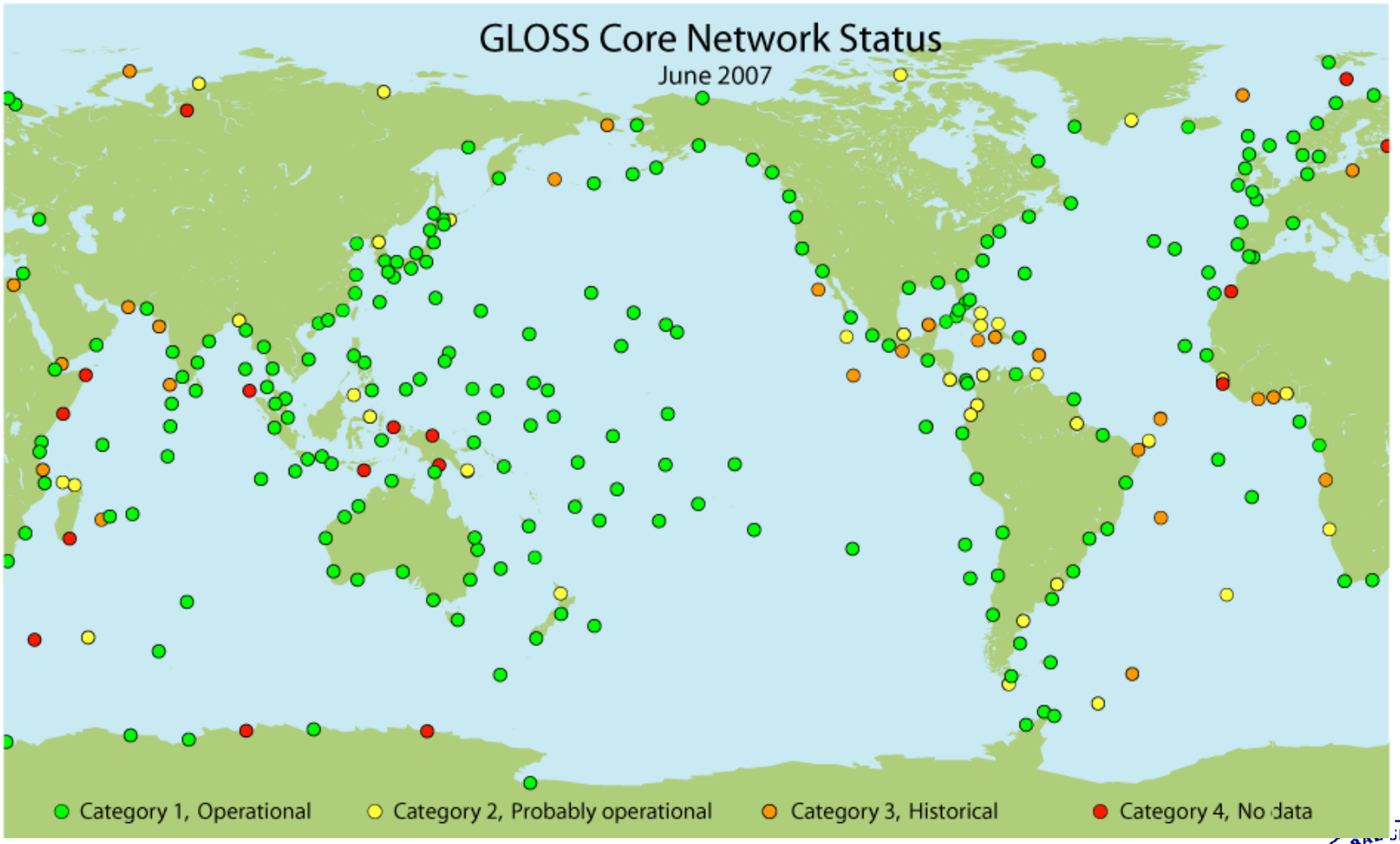
3. Near real time: High frequency data to UHSLC and International Tsunami Warning Centers

4. GPS data to TIGA Centre at Potsdam (Germany) initiated by IGS/PSMSL in 2001.

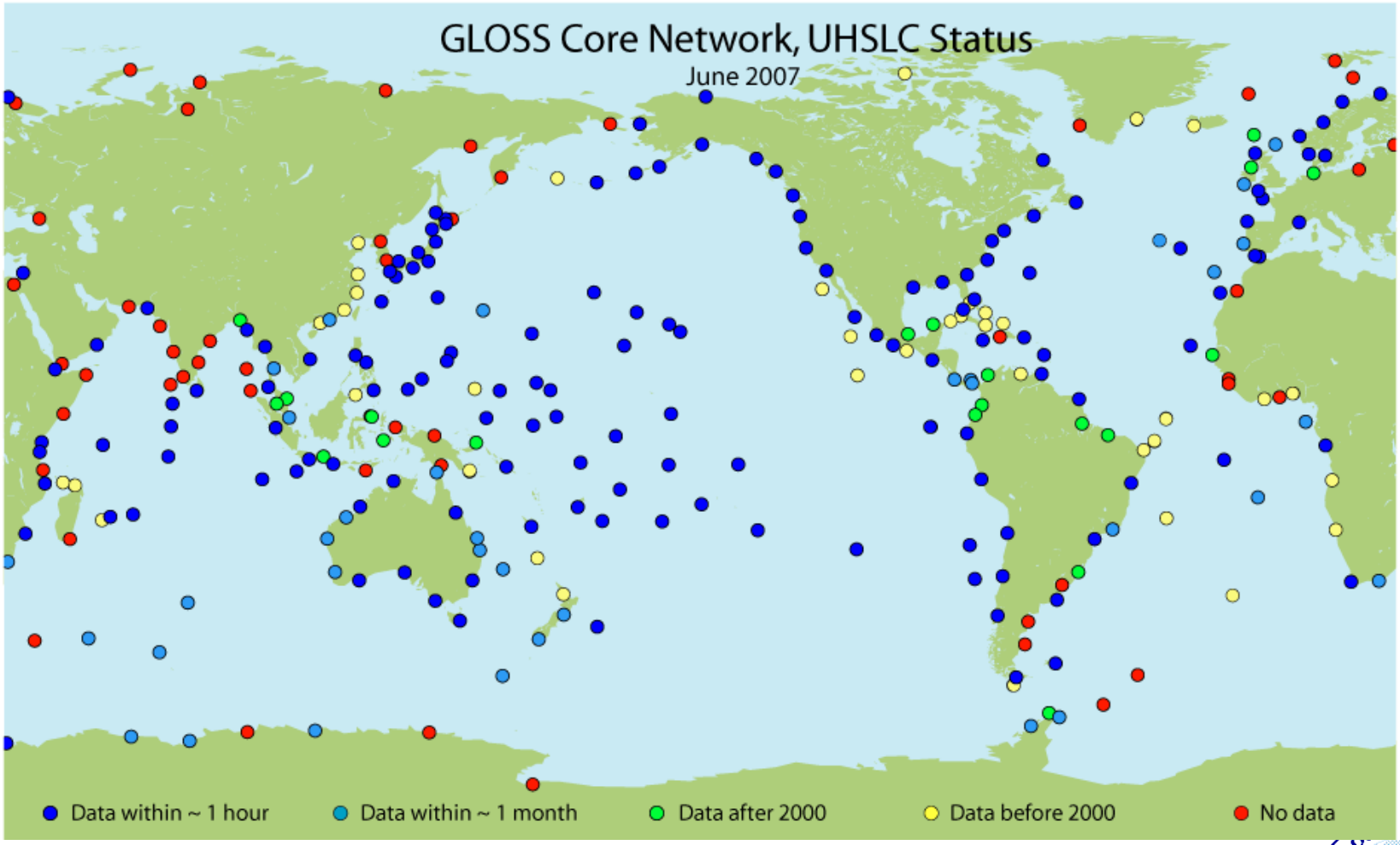
GLOSS Also Provides ...

1. Coordination mechanism for global sea level observations (e.g. GLOSS Group of Experts)
2. Global data standards and archiving facilities, QC of data
3. Technical manuals and training material
4. Technical advice and special workshops on technical issues
5. Training courses on analysis and uses of sea level observations
6. Hardware (e.g. tide gauges, GPS, transmitters)

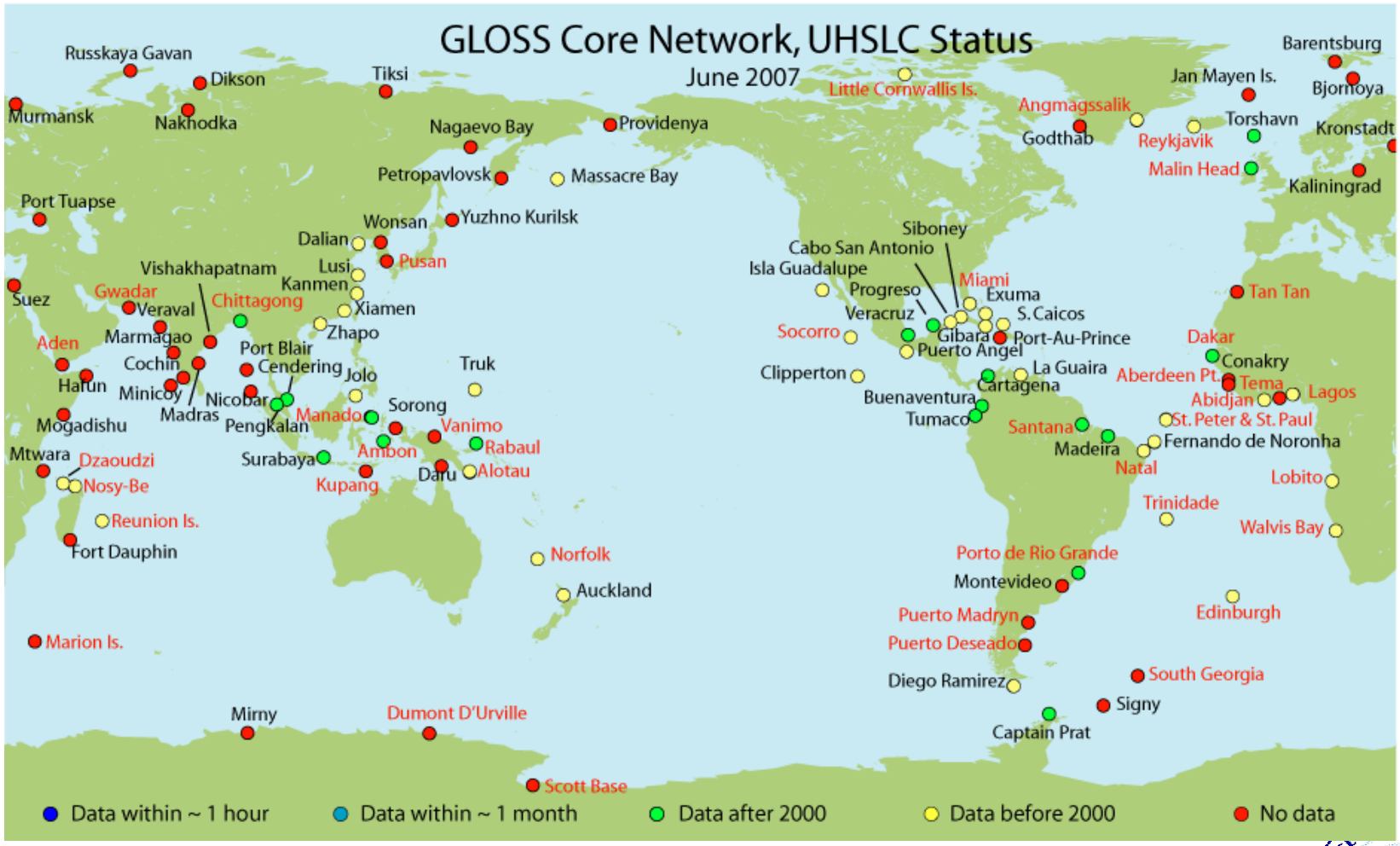
Delayed Mode Low Frequency Sea Level Stations



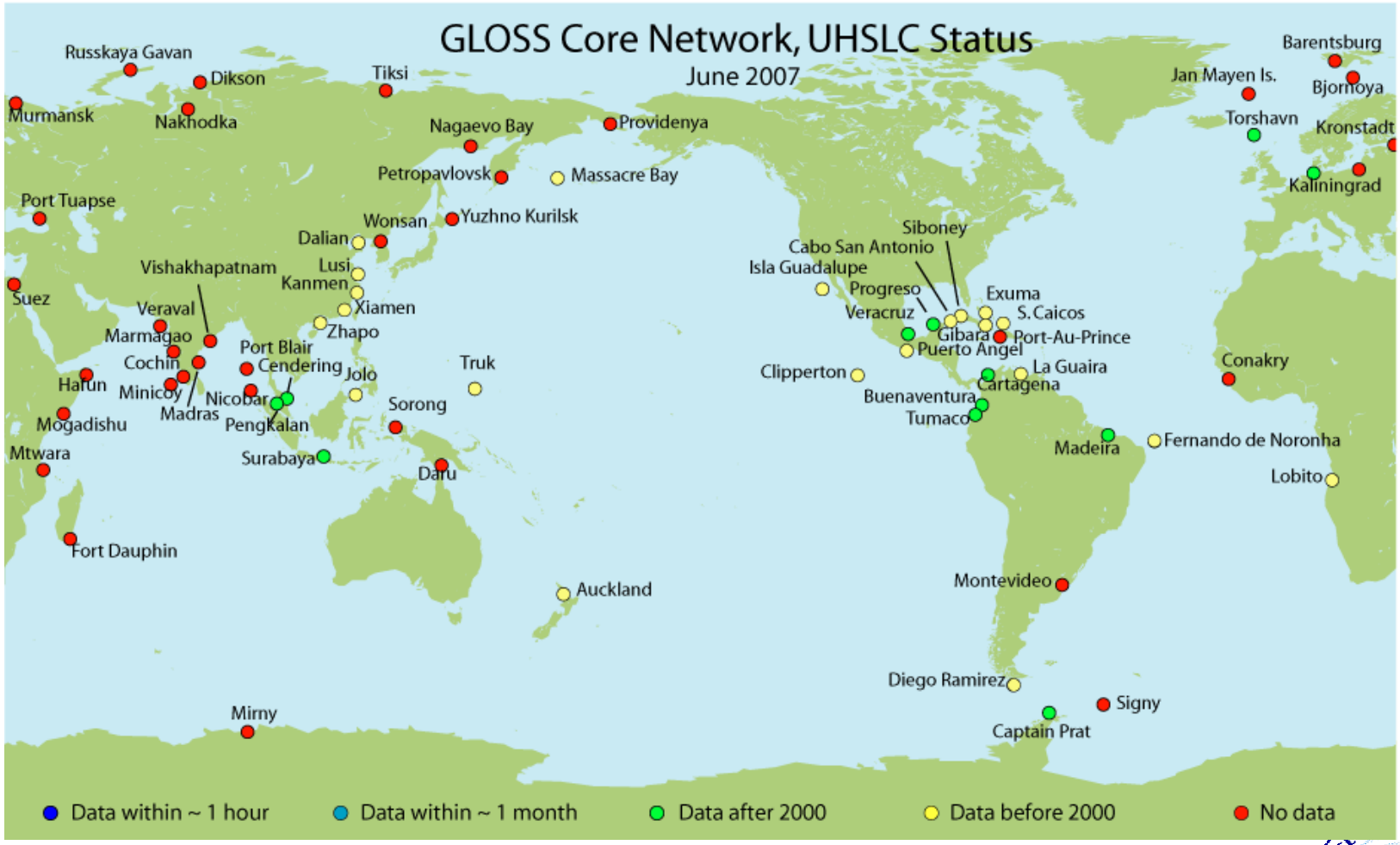
High Frequency Sea Level Stations



Planned for Upgrades for 2007-2008

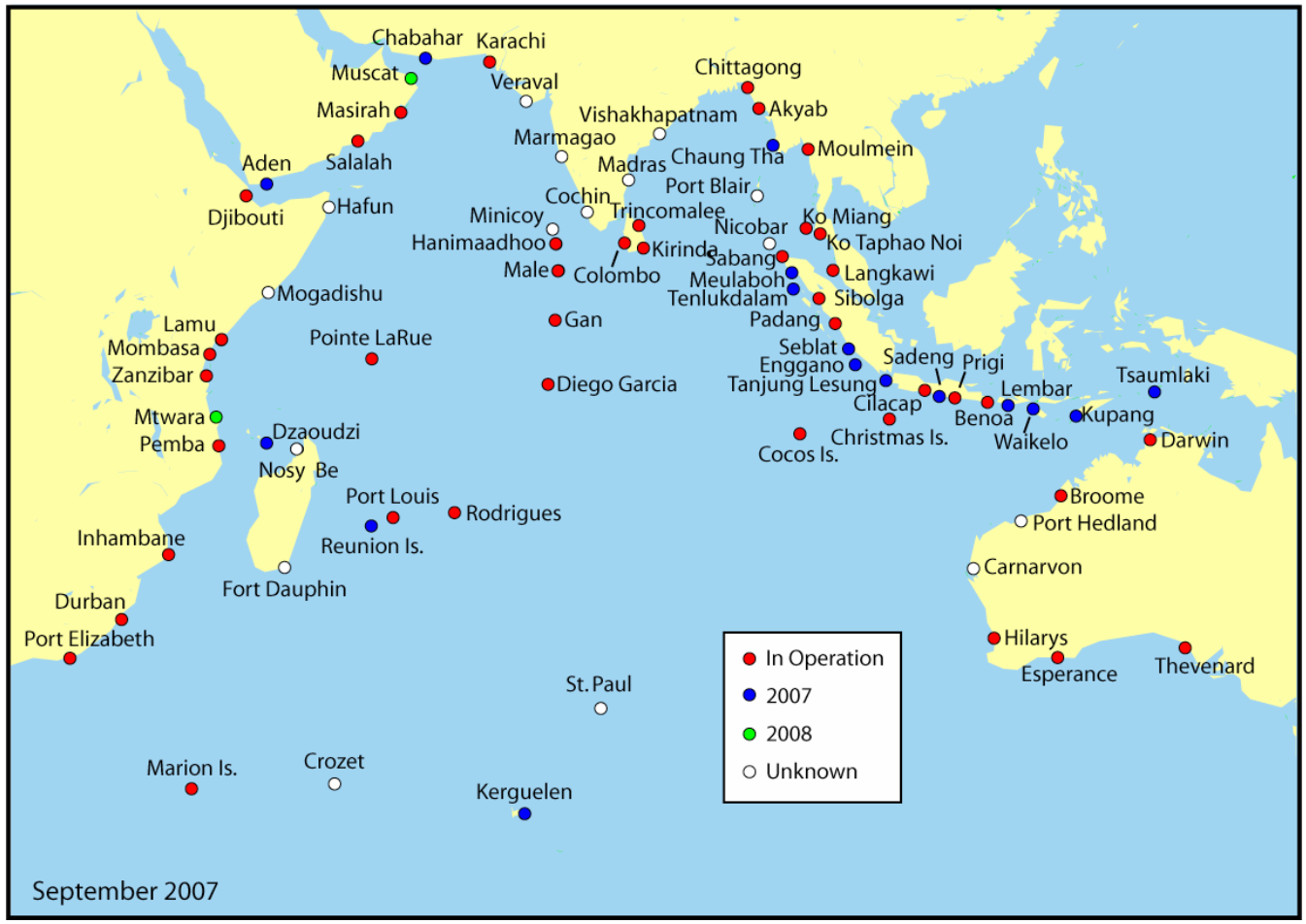


Stations Needing Upgrades and/or No Recent Provision of High Frequency Data



Status of African Tide Gauges

Status of Tide Gauge in the Indian Ocean



Recent Progress and Reports

1. **Presentations, national reports and action list from *10th GLOSS Group of Experts Meeting* (June, 2007) available at http://www.ioc-goos.org/glossge10**
2. **Presentations on *Workshop on Real-time Transmission and Processing Techniques: Improving the Global Sea Level Observing System* (June, 2007). Available from above web-site.**
3. ***Sea Level Fellowship programme* (Indian Ocean Tsunami Warning System). For details see (http://ioc.unesco.org/iocweb/docs/IOTWS-Sealevel-Fellowship-07-2ndRound.pdf)**

How Can IHO TC Assist GLOSS?

1. **Consider GLOSS requirements when upgrades are carried out by Member States (Appendix, Manual on Sea Level Observation and Analysis)**

2. **Encourage collaboration between tide gauge agencies and national GPS communities (typically geodetic/survey agencies)**

3. **Encourage data exchange/provision to GLOSS Data Centers (PSMSL, UHSLC). As status maps show, problems with high frequency data exchange from GLOSS CN stations in India, China, and Russia.**

Thanks For Your Time

Questions about scientific value of sea level observations? Please feel free to contact

keith.thompson@dal.ca

or Thorkild Aarup (IOC) at

t.aarup@unesco.org

who can also answer questions related to the organization and administration of GLOSS.