



FIG Pacific Small Island Developing States Symposium

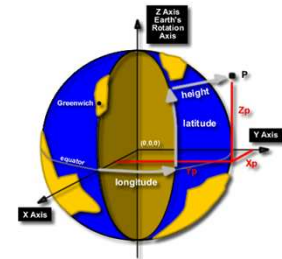
Asia Pacific Reference Frame in Support of Responsible
Governance and Sustainable Development

Dr John Dawson, Chair UN-GGIM-AP WG1



Presentation Overview

- Importance of Geodetic Infrastructure



- UN-GGIM-AP Geodetic Activities



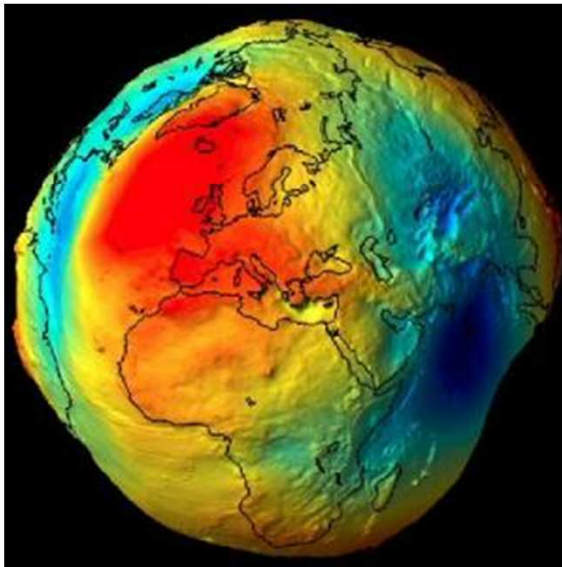
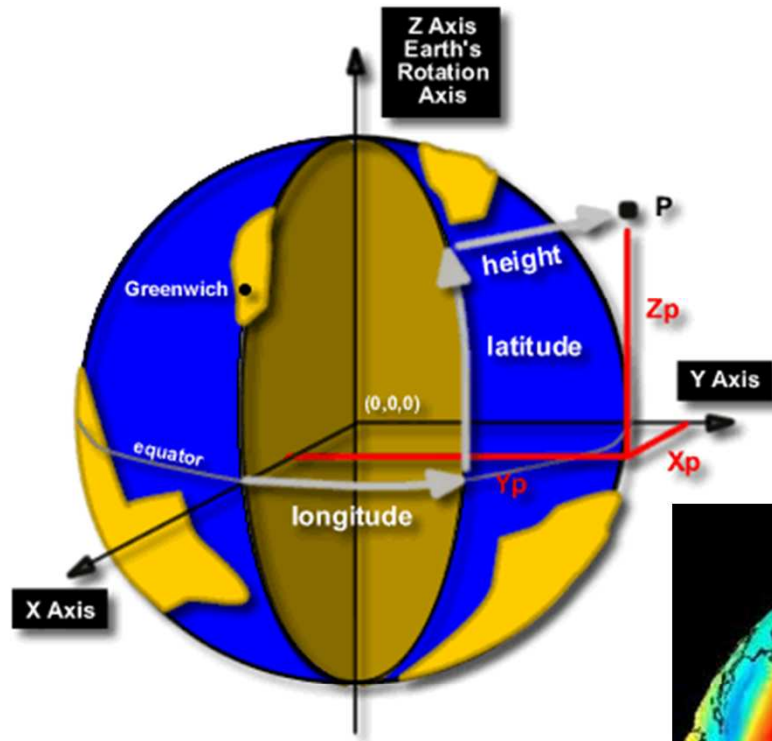
- Asia Pacific Reference Frame (APREF)



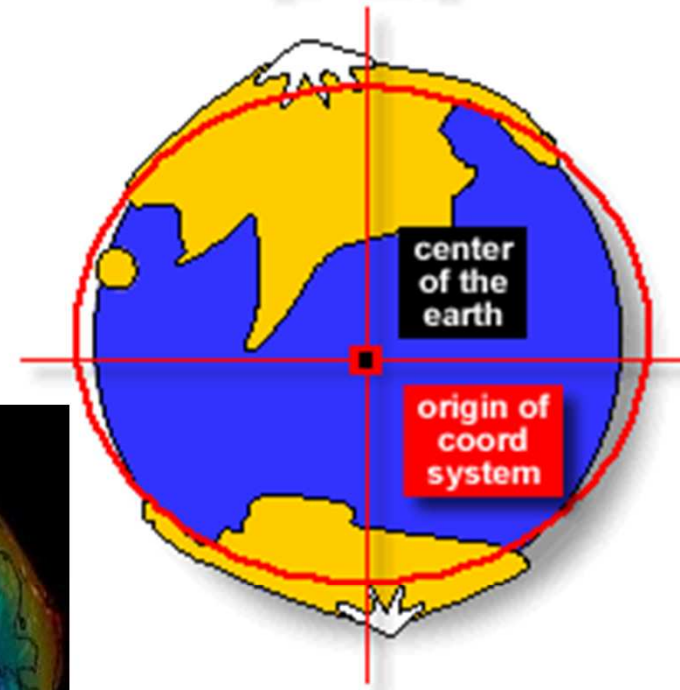
- Issues and Opportunities for the Pacific

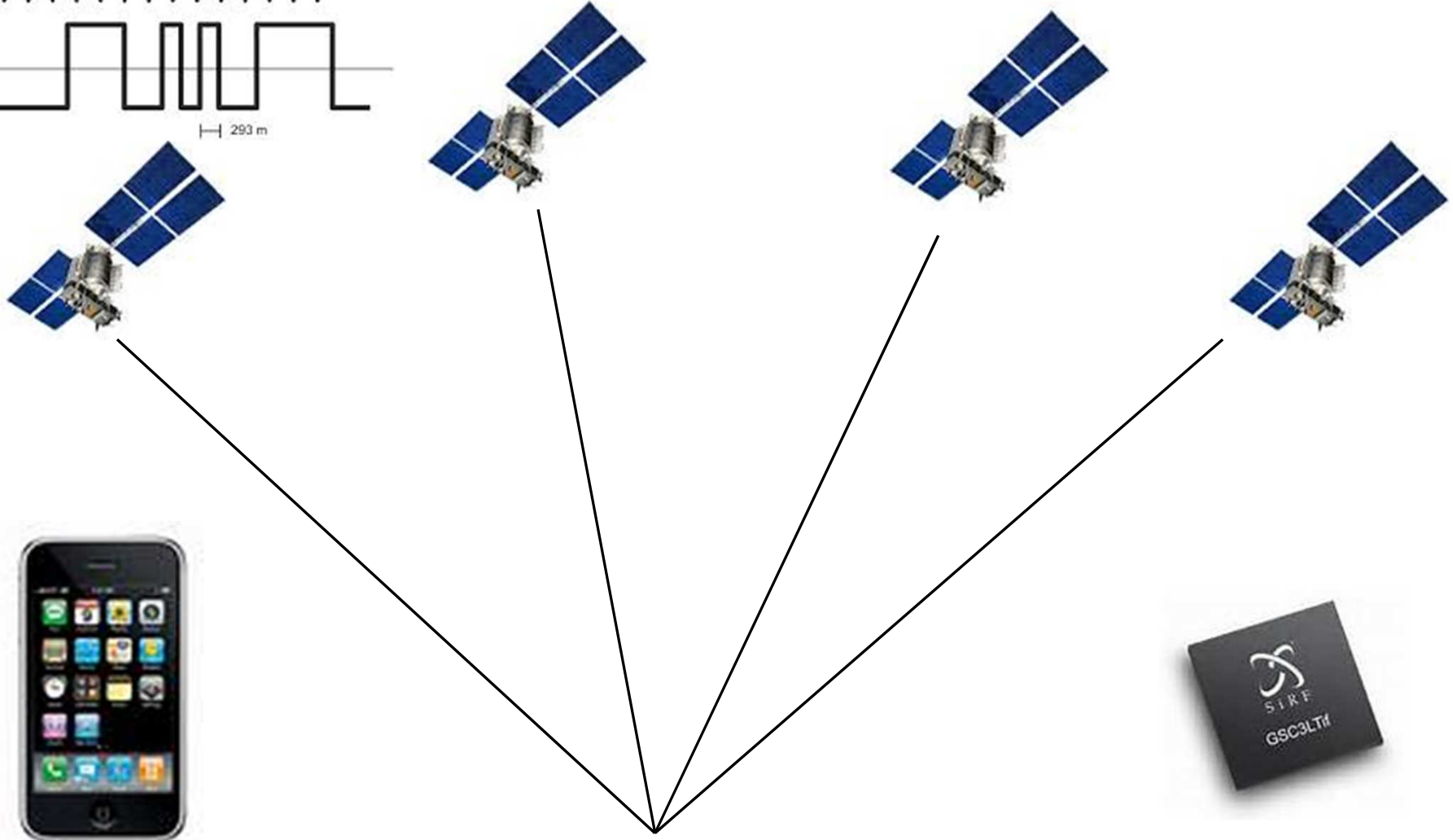
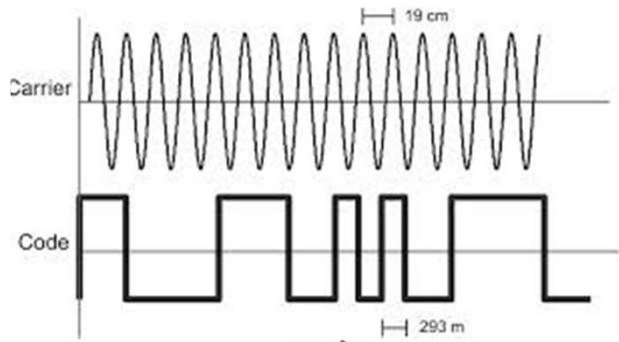


Geodetic Infrastructure → Location



GEOCENTRIC
DATUM
[GRS80]



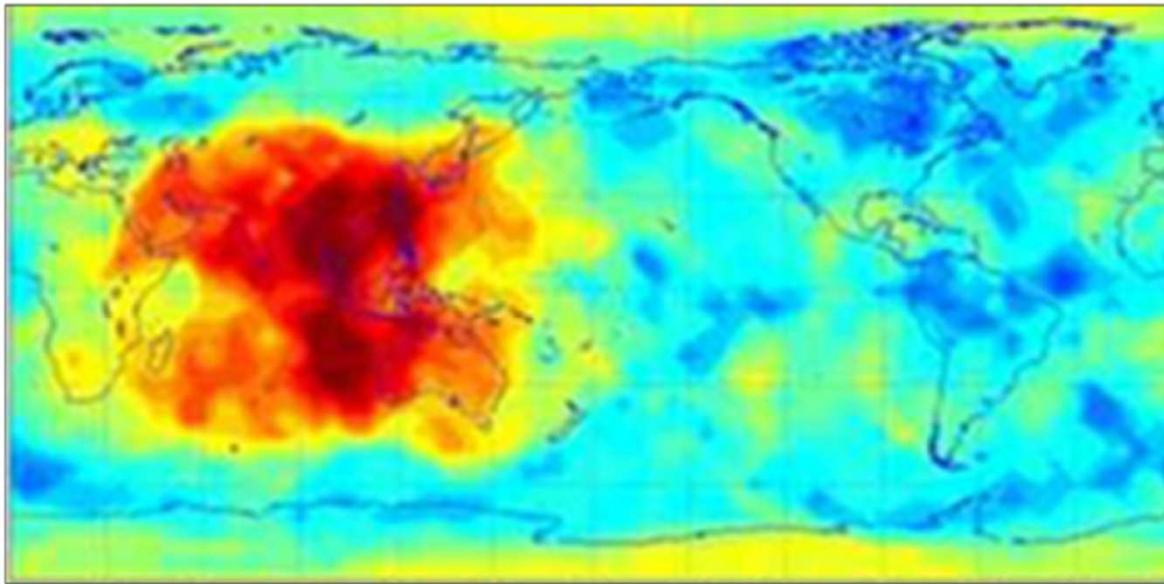


+/- 5 metres accuracy now
+/- 0.06 metres accuracy by 2018



Asia's GNSS Geographic Advantage

Visible satellite number (mask angle 30 degrees)

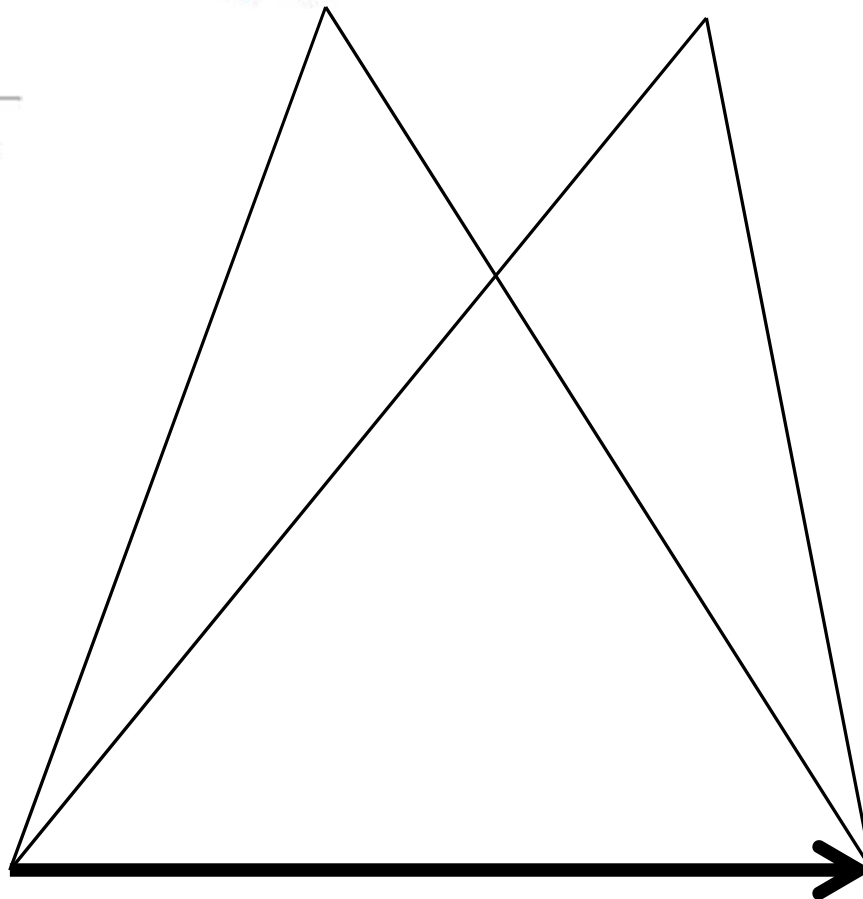
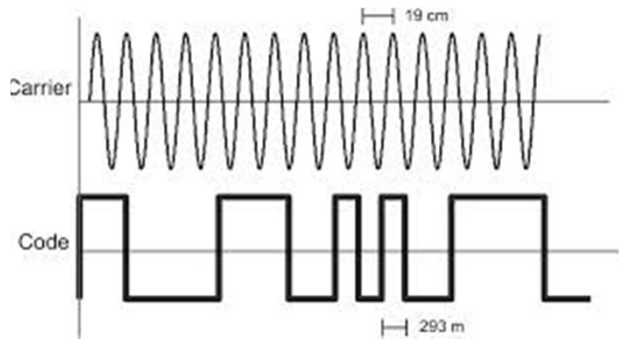


GPS(27)+Glonass(24)+Galileo(30)+COMPASS(35)+IRNSS(7)+QZSS(3)+SBAS(7)



GPS GLONASS Galileo Beidou

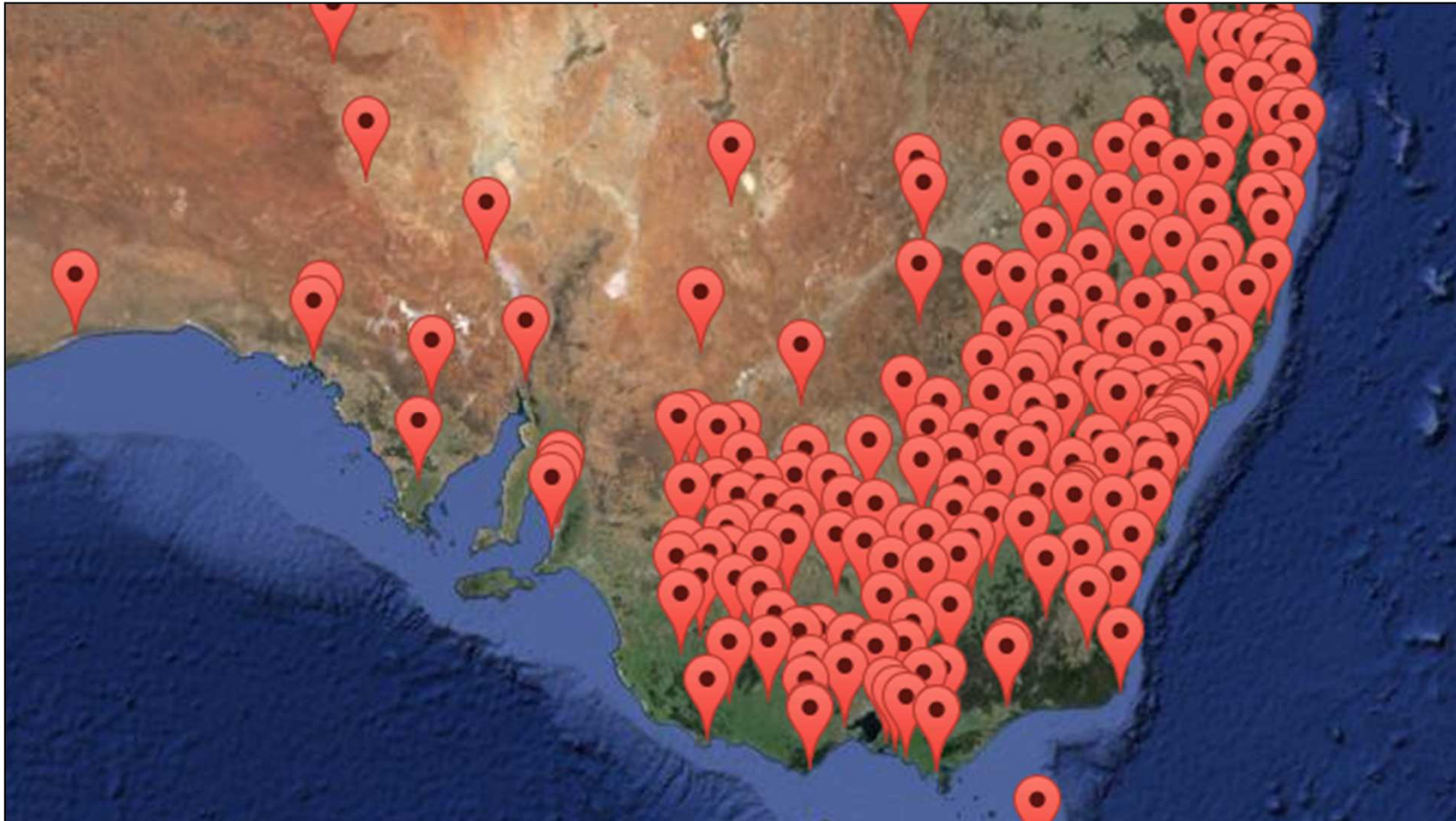




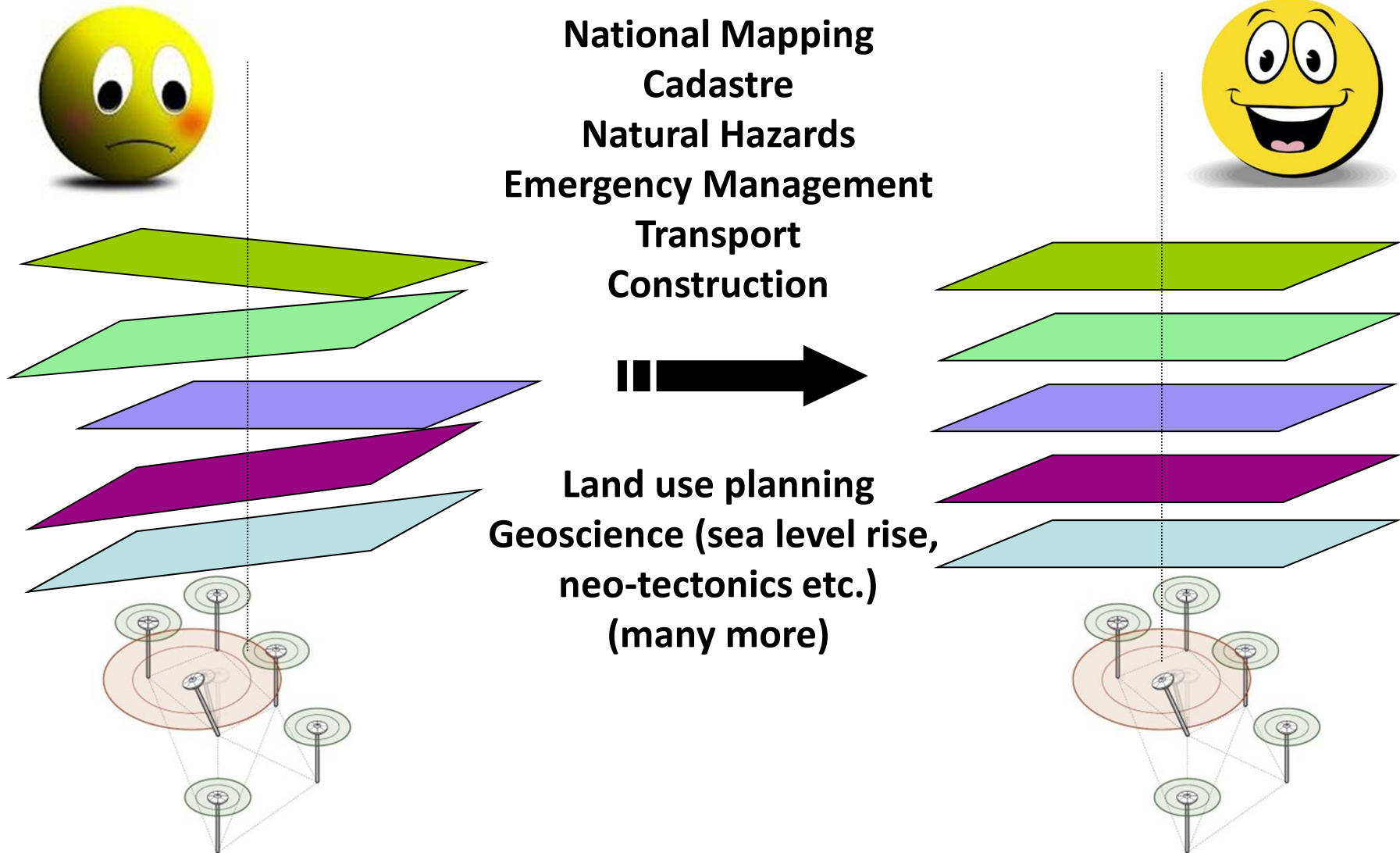
+/- 1 cm accuracy or better



Development of GPS CORS Infrastructure



Location Enabled Society

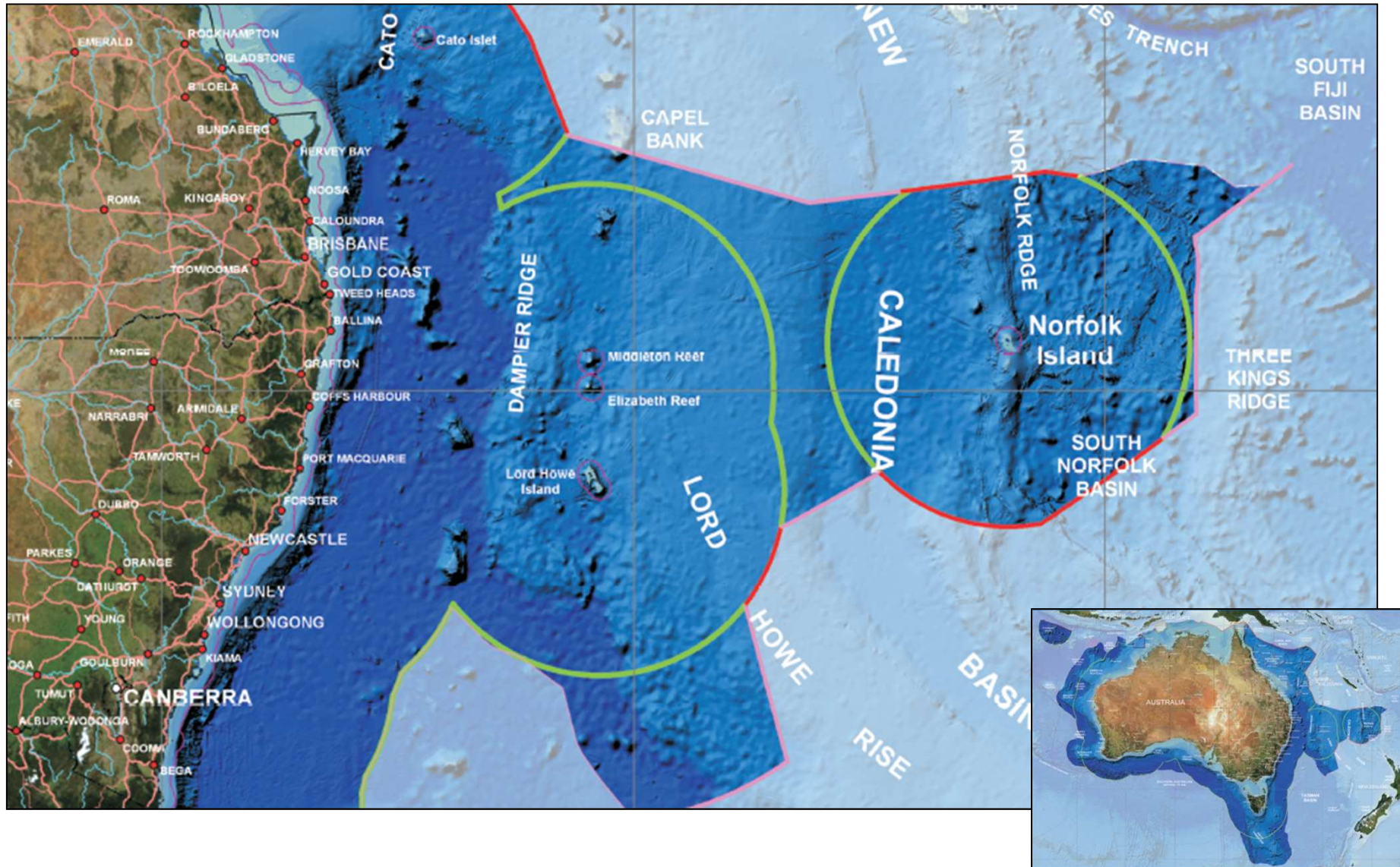




Emerging Industrial Applications

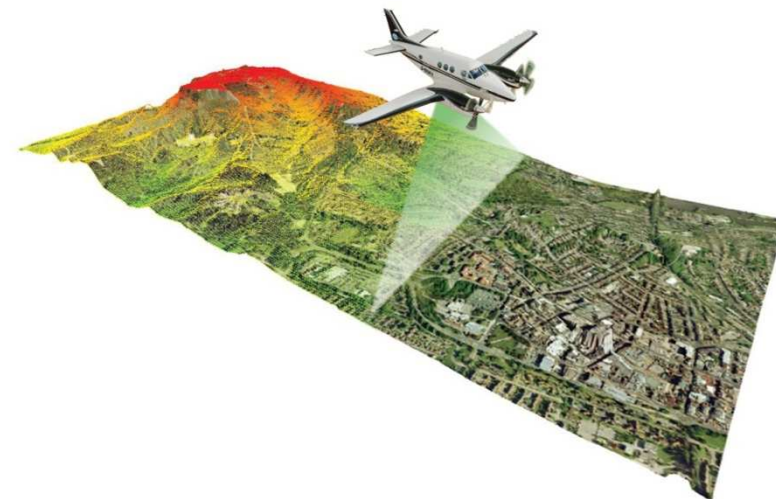
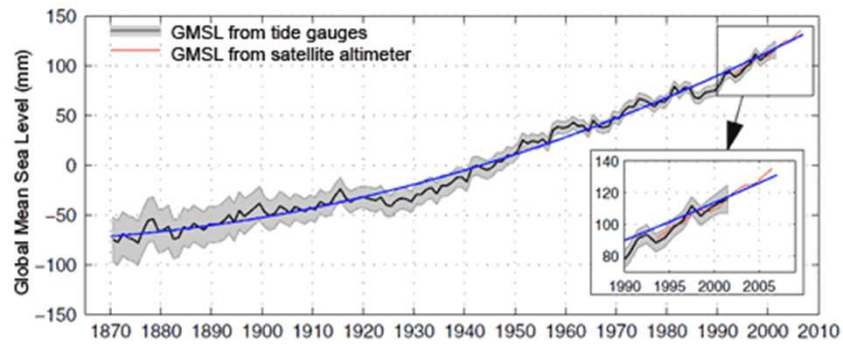
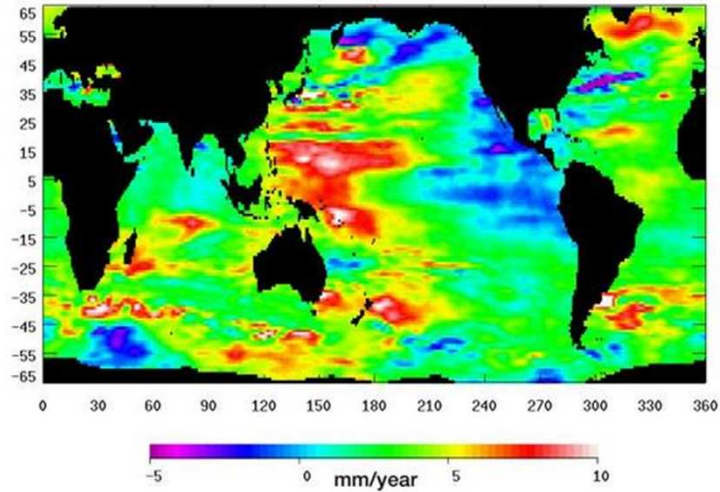


Maritime Boundaries

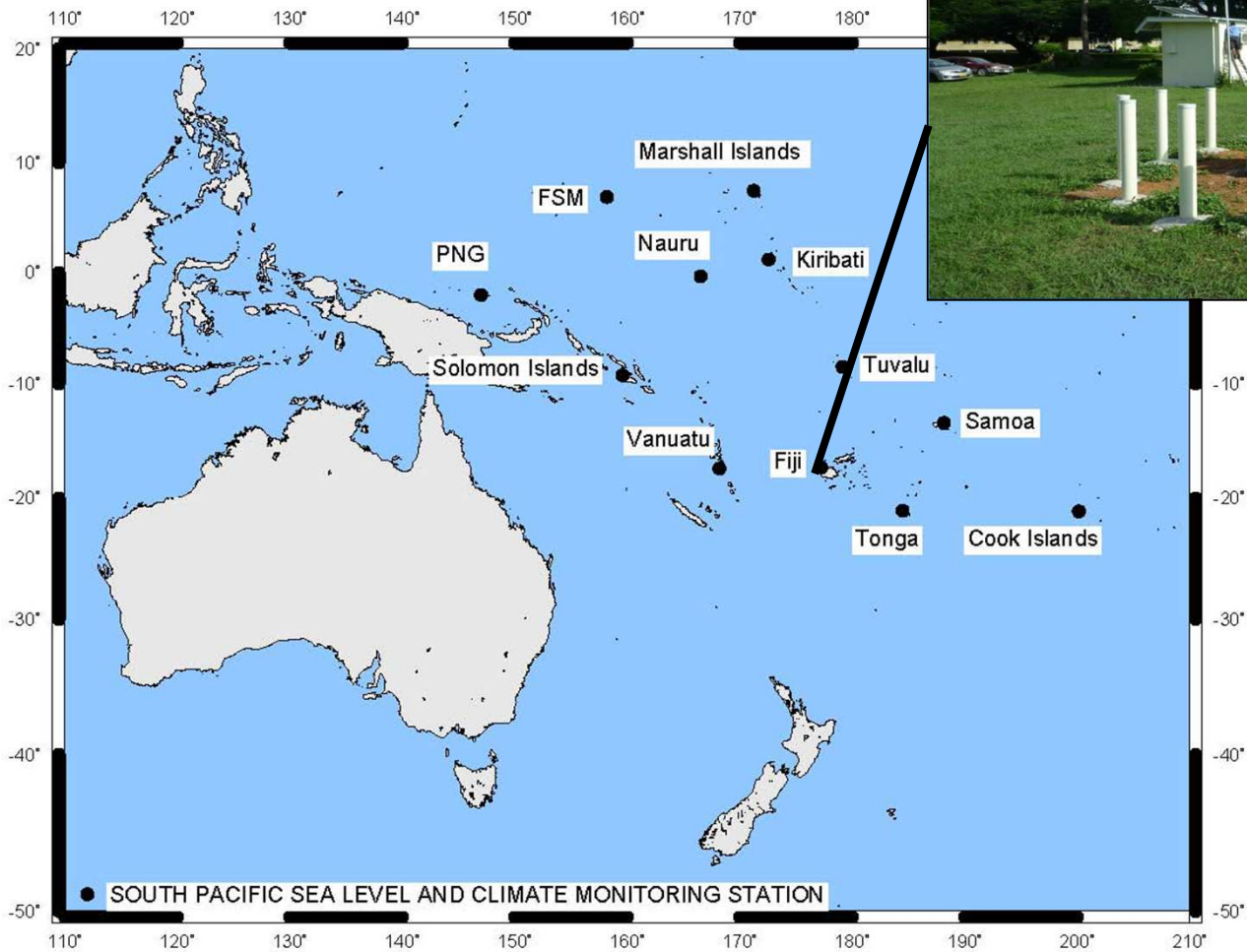


Understanding Sea Level

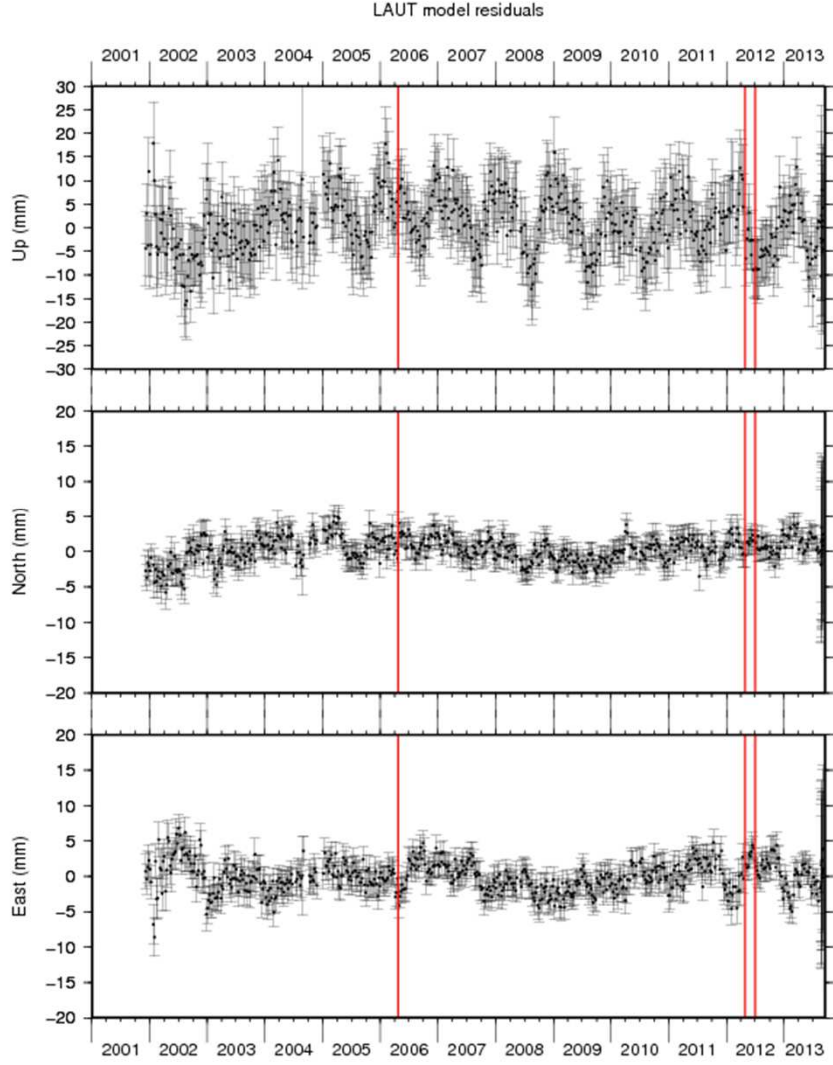
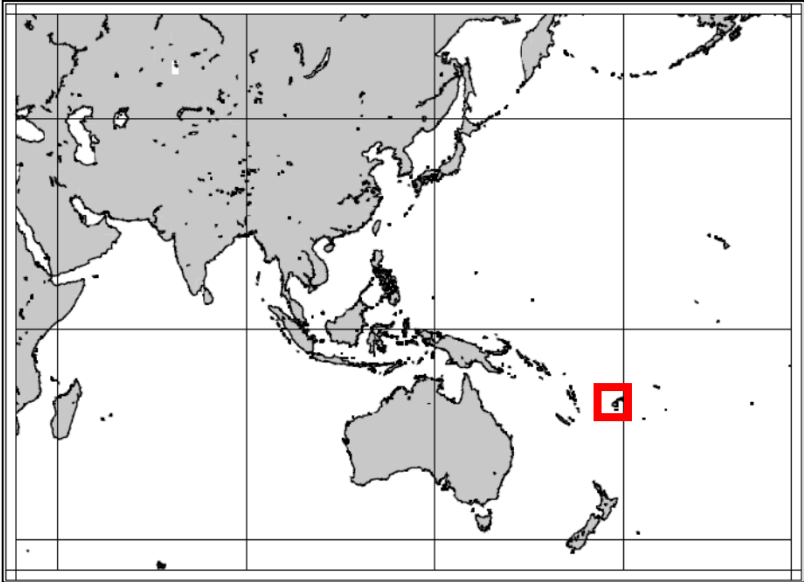
Trend of Sea Level Change (1993-2008)



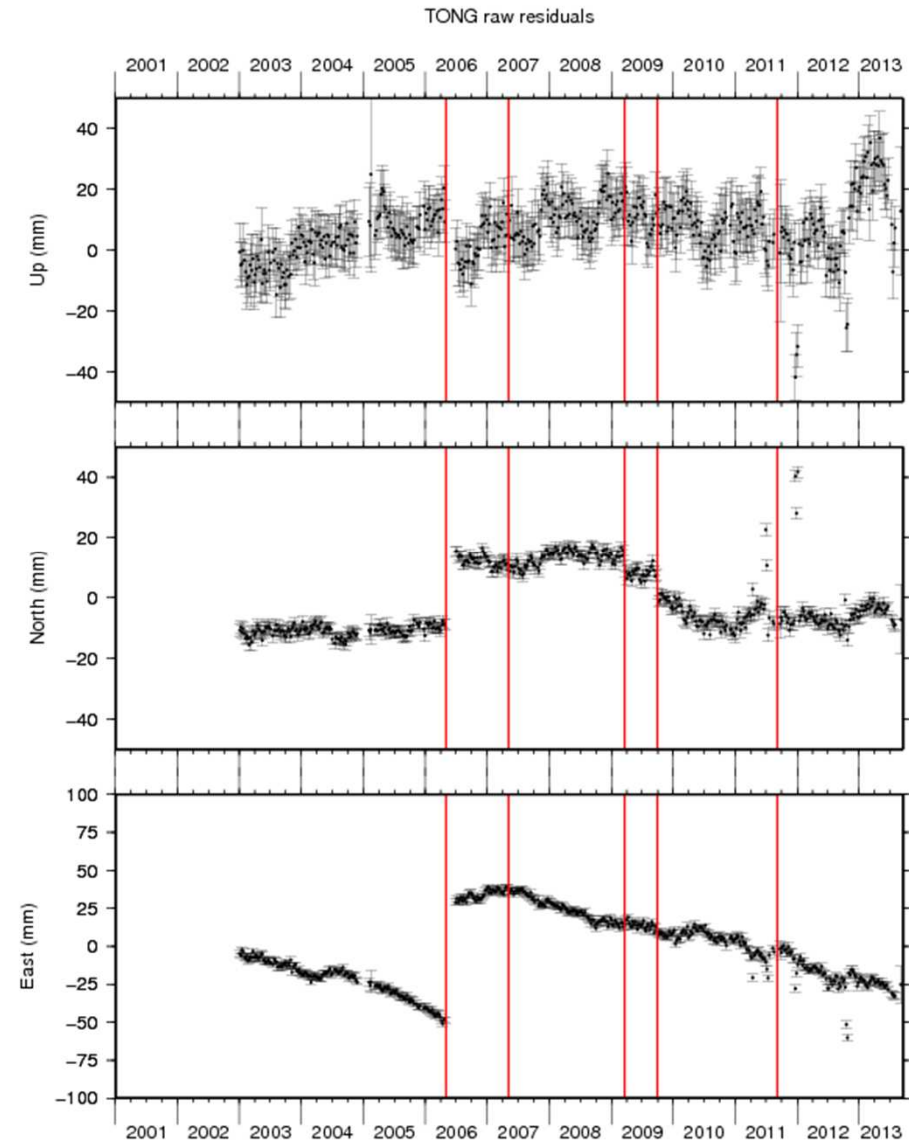
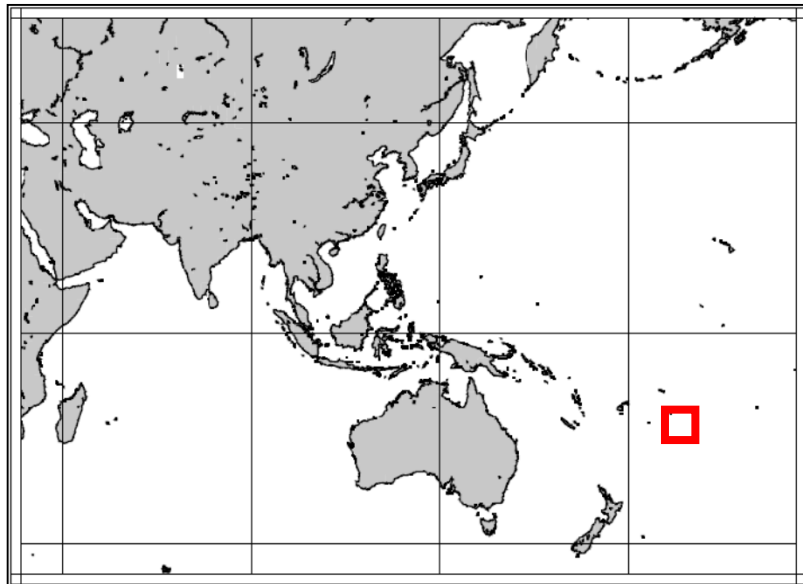
Understanding Sea Level



GPS Coordinate Time Series: Fiji



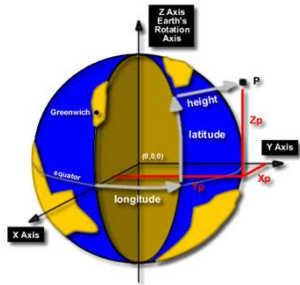
GPS Coordinate Time Series: Tonga



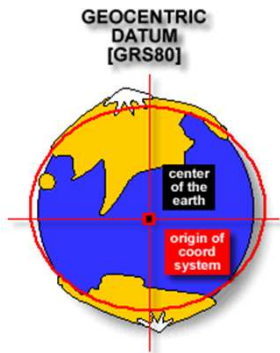


UN-GGIM AP Geodesy Working Group

Access to ITRF
- APRGP



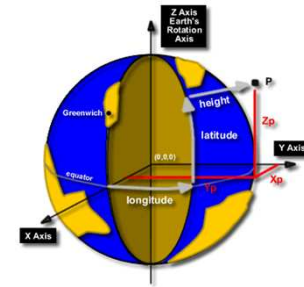
Regional Height
System



Capacity
Building



Access to ITRF
- APREF



UN-GGIM
Geodetic
Questionnaire



Asia Pacific Reference Frame

- Access to high quality positioning infrastructure is essential for effective competition with the other regions, including Europe and the Americas
- Coordination of regional geodetic activities not well developed in the AP





APREF: Objectives

- Create and maintain an accurate and densely realised geodetic framework, based on continuous observation and analysis of GNSS data
- Encourage regional data sharing of GNSS CORS data and its analysis





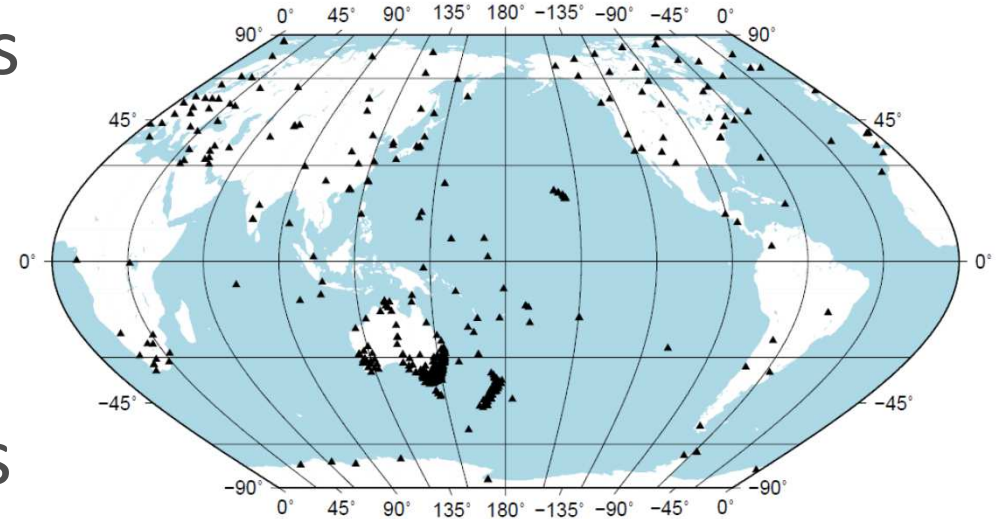
Benefits of APREF Participation

- Improved and continuous link between national datums and CORS networks to the ITRF
- Contribute to a open and dense ITRF network in Asia and the Pacific
- Independent quality monitoring
- Improved access to GNSS data
- Providing an opportunity and a forum towards improving the regional geodetic infrastructure



APREF Current Status

- Data from 33 countries
- 16 national agencies participating
- 3 local analysis centres
- 2 universities participating
- ~ 400 Asia Pacific stations now available
- ~ 500 stations routinely analysed





APREF Website

A screenshot of a Windows Internet Explorer browser window displaying the APREF website. The browser title is "Asia-Pacific Reference Frame (APREF) - Geoscience Australia - Windows Internet Explorer". The address bar shows the URL "http://www.ga.gov.au/earth-monitoring/geodesy/asia-pacific-reference-frame.html". The website content includes a navigation menu with links for Home, About Us, Contact Us, Jobs, News & Media, Education, and Library. The main header features the Australian Government Geoscience Australia logo and a satellite image of Australia. The main content area is titled "Earth Monitoring and Reference Systems" and includes a search bar. Below this, there is a breadcrumb trail: "Home > Earth Monitoring and Reference Systems > Geodesy and Global Navigation Systems > Asia-Pacific Reference Frame >". The main heading is "Asia-Pacific Reference Frame (APREF)". A list of links includes: Background of APREF, Objectives of APREF, APREF organisational structure, Participating agencies, Data and products, How can I participate in APREF?, Station and data standards, Analysis standards, and APREF mandate. A paragraph explains the purpose of the APREF project: "The purpose of the Asia-Pacific Reference Frame (APREF) project is to create and maintain an accurate geodetic framework to meet the growing needs of industries, science programs and the general public using positioning applications in the Asia-Pacific region." Below this is a section titled "Background of APREF" which states: "The use of positioning technology is growing rapidly in industries such as mining, agriculture and construction. Furthermore, in recent years, there has been an increasing demand from emergency services, hazard modellers, and land, utility and asset managers. The applications of these users have a demonstrated need...". On the right side, there are sections for "PRODUCTS" with a search bar and links for Maps, Data/Applications, Publications, and Multimedia, and "RELATED WEBSITES" listing the International Association of Geodesy (IAG), Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP), International GNSS Service (IGS), and International Earth Rotation and Reference Systems Service (IERS). The browser status bar at the bottom shows "Error on page." and "Internet" with a 100% zoom level.

<http://www.ga.gov.au/earth-monitoring/geodesy/asia-pacific-reference-frame.html>



UN-GGIM Questionnaire Background

- The concept of a global geodetic questionnaire arose from the Second Session of the United Nations Committee of Experts on Global Information Management in New York in August, 2012
- Questionnaire format and content discussed after the UNRCC forum in Bangkok, October 2012
- Questionnaire distributed globally in December 2012 by the UN
- Over 100 responses received



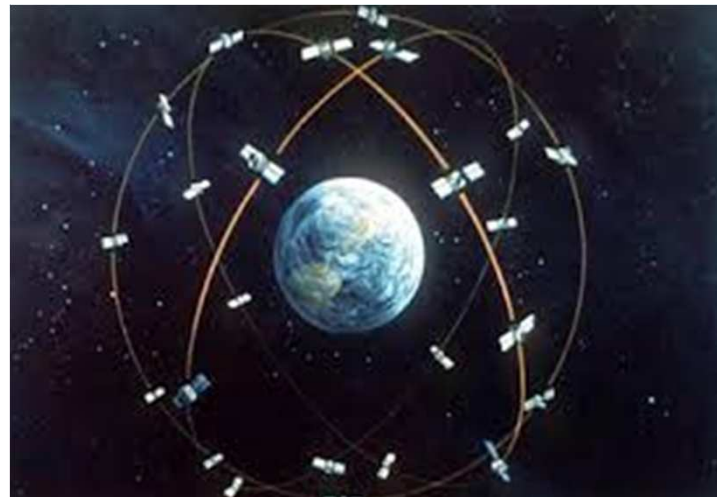
Questionnaire Objectives

- Provide a global ‘snap-shot’ of the use of geodetic data and datums
- Measure the reliance on global infrastructure, products and services
- Measure current and anticipated future participation in the global geodetic community
- Identify the legal, administrative, commercial and resourcing impediments that currently limit data sharing and global participation.



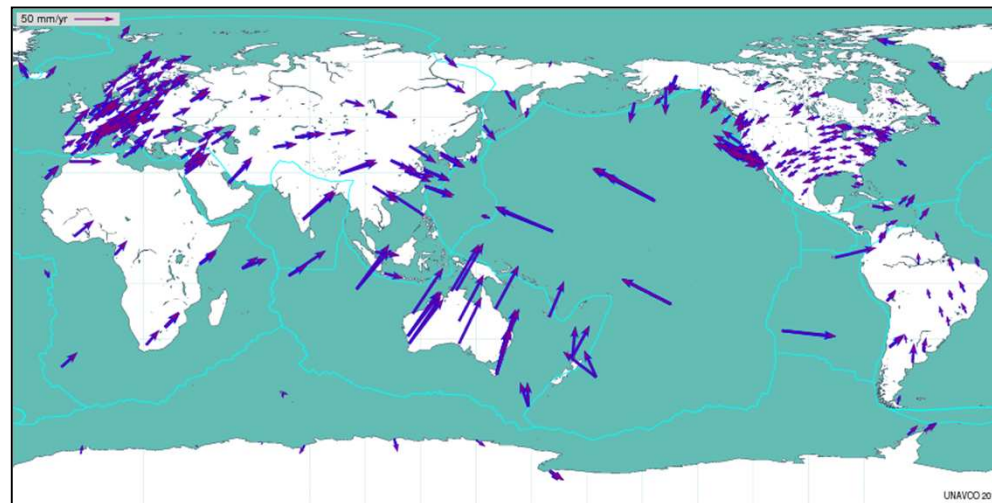
Questionnaire - Key Findings

>80% of responses indicated that the data, products and services of the international global geodetic community (e.g. ITRF, IGS orbits) were either *critical* or had *high* importance in their country



Questionnaire - Key Findings

80% of all responding countries use the International Terrestrial Reference Frame (ITRF) to underpin their national coordinate datum

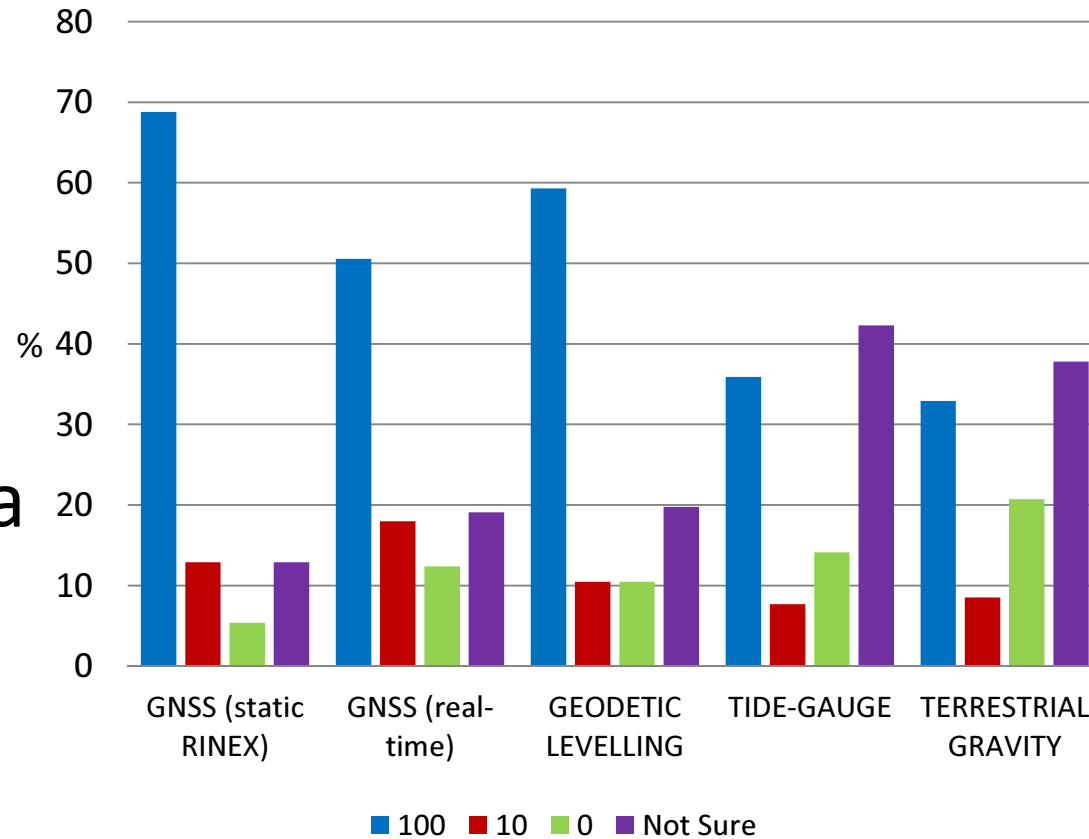




Questionnaire - Key Findings

Only 69% of responding countries are willing/able to freely share static GNSS data to the global community

Q13: % of total data that can be shared internationally?





Questionnaire - Key Findings

75% of respondents indicated that their organisation would benefit from a high level mandate to:

- Motivate Member States to improve international engagement on geodetic matters
- Encourage additional investment by Member States in geodetic infrastructure
- Encourage free and open access to geodetic data

Issues and Opportunities for the Pacific

- Sea level change is a big driver for improved geodetic infrastructure
- Data from Pacific key to understanding sea level change
- Technology (GNSS) opportunities being missed
- Technical capacity and resourcing in the Pacific remains an issue
- Improved regional and intra-agency collaboration required





UN-GGIM-AP

REGIONAL COMMITTEE OF
UNITED NATIONS
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT
FOR ASIA & THE PACIFIC

Thank you