



UN-GGIM-AP

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

Activity Report of UN-GGIM-AP WG1- Geodetic Reference Framework for Sustainable Development

Work Plan of the WG1 (2012 – 2015)

- Asia-Pacific Reference Frame (APREF) Project – ongoing
- Asia-Pacific Regional Geodetic Project (APRGP) – ongoing (1 week per year)
- Asia-Pacific Regional Height System Unification (APRHSU) Project – ongoing
- Asia-Pacific Geodetic Capacity Building (APGCB) Project – ongoing (1 meeting per year)



UN-GGIM-AP

Objectives of the APREF Project

- Currently, APREF is all about sharing GNSS CORS data and its analysis
- The broad objective of APREF is to
 - Create and maintain an accurate and densely realised geodetic framework, based on continuous observation and analysis of GNSS data



Benefits of the APREF Project

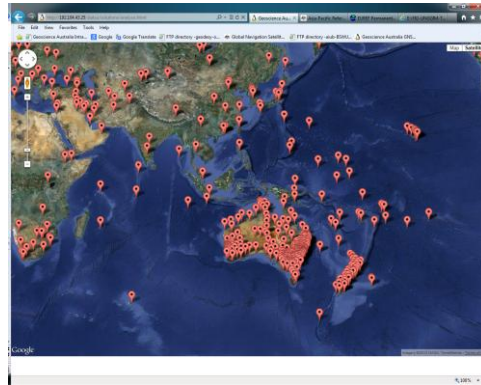
- Major benefits of participation
 - Improved and continuous link between national datums and CORS networks to the ITRF
 - Dense ITRF network in Asia Pacific
 - Independent quality monitoring
 - Improved access to GNSS data
 - Providing an opportunity and a forum towards improving the regional geodetic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



Status of the APREF Project

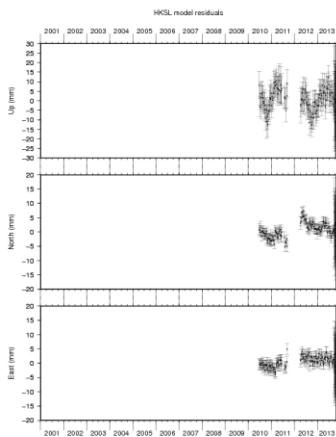
As of October 2013

- Data from 28 countries
- 16 national agencies participating
- 2 universities participating
- ~ 350 Asia Pacific stations now available
- ~ 500 stations routinely analysed



Products and applications of the APREF

- Generates coordinate time series of CORS sites
- Provides access to ITRF



Cartesian Coordinates and Velocities (ITRF2008)

Position: X, Y, Z (metres), Velocity: X, Y, Z (metres per year), Coordinate Epoch

HKSL 1 H00000068 C -2393282.6270 5393561.0231 2412592.2550 -0.0310 -0.0126 -0.0078 01-May-12

Geodetic Coordinates and Velocities (ITRF2008)

Position: longitude (degrees minutes seconds), latitude (degrees minutes seconds), height (GRS80, metres) Velocity: East, North, Height (metres per year), Coordinate Epoch

HKSL 1 H00000068 C 113 55 40.7483 22 22 19.2124 95.2654 0.0336 -0.0076 -0.0022 01-May-12

Station Events

None.

Estimated Discontinuities

None estimated.

Useful links

[RINEX data used in this computation.](#)

[Full SINEX format solution files.](#)

Last updated: Thursday, 17 October 2013 6:01:19 PM EST



APREF data and products availability

- APREF data and products are provided with an open access data policy via the internet following the practice of the IGS.
 - Daily GNSS RINEX data with a delay of 24 hr after observation, see:
<ftp://ftp.ga.gov.au/geodesy-outgoing/gnss/data/daily/>
 - Station log files, see:
<ftp://ftp.ga.gov.au/geodesy-outgoing/gnss/logs/>
 - Weekly updated coordinate estimates in SINEX format, see:
<ftp://ftp.ga.gov.au/geodesy-outgoing/gnss/solutions/apref/>
 - APREF network and time-series plots, see:
<http://192.104.43.25/status/solutions/analysis.html>



Challenges of the APREF Project

- Issues remain regarding free and open access to data for many Asia-Pacific countries
- Need to identify additional analysis centres
 - limited redundancy with only 3 analysis groups



How to participate in the APREF project

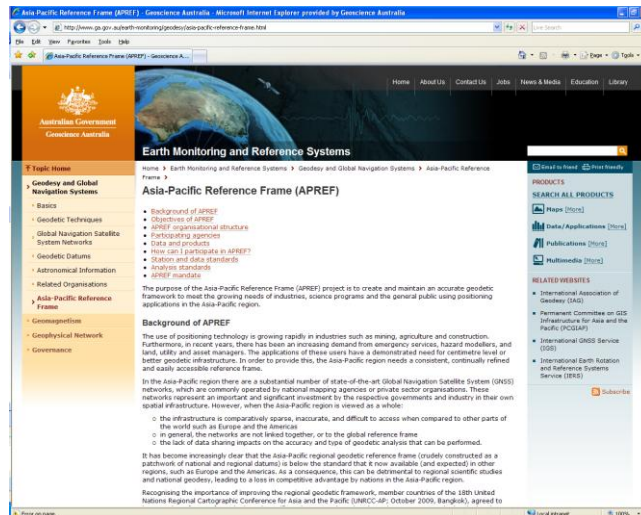
APREF encourage organizations who are prepared to participate , on an ongoing basis (at least two years):

- provide GNSS CORS stations data;
- provide access and on-line archiving of APREF data and products for users; and/or
- routinely analyse some, or all, of the APREF GNSS CORS data



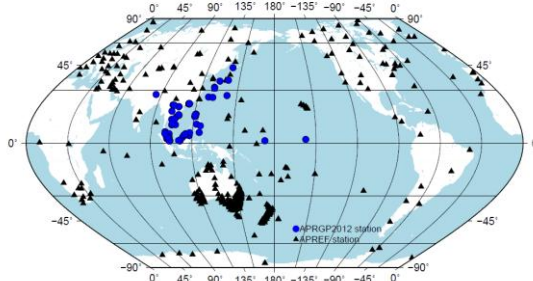
APREF website for more information

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



Status of the APRGP Annual GNSS Campaign

- APRGP 2012 GNSS campaign was carried out from 9th September 2012 to 15th September 2012 (GPS week 1705), coordinated by Geoscience Australia
- The data were contributed from 11 countries and regions
- Analysis report has been distributed the participant members



Status of the APRGP Annual GNSS Campaign

- APRGP 2013 GNSS campaign ran from 8th September 2013 to 14th September 2013 (GPS week 1757), coordinated by Geoscience Australia
- The data have been received from seven countries:
 - Brunei;
 - Cambodia;
 - Indonesia;
 - Japan;
 - Laos;
 - Malaysia;
 - Nepal



Status of the Asia-Pacific Geodetic Capacity Building (APGCB) Project

- The Reference Frame in Practice Symposium held in Manila, Philippines, 21 – 22 June 2013
 - 40 participants from the Asia-Pacific region
 - 20 technical presentations
- FIG Pacific Small Island Developing States Symposium held in Suva, Fiji, 18 – 20 September 2013 with a session entitled Reference Frame in Practice for Responsible Governance
- The XXV FIG International Congress (Kuala Lumpur, Malaysia, 16 – 21 June 2014) will include a workshop dedicated to the APREF



Summary of responses to the UN-GGIM Geodetic Questionnaire

- 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



Summary of responses to the UN-GGIM Geodetic Questionnaire

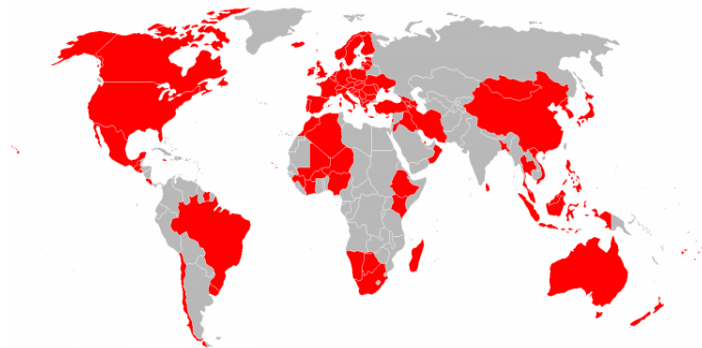
➤ Questionnaire Objectives

- 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



Summary of responses to the UN-GGIM Geodetic Questionnaire

- 101 responses received from 97 countries (as of July 2013)

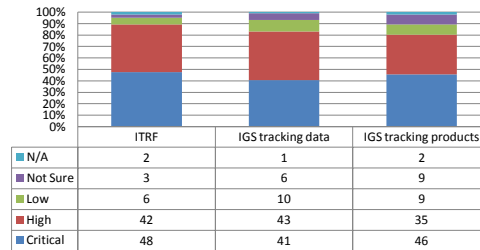


Summary of responses to the UN-GGIM Geodetic Questionnaire

➤ Key Findings

- 88% 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

% of responses to Q8: How important are geodetic data, products, and services?

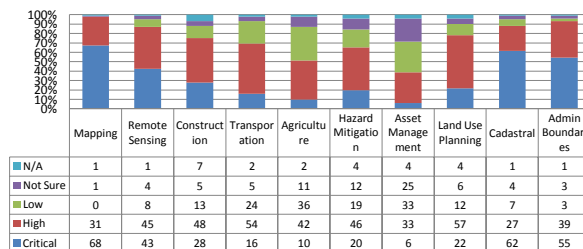


Summary of responses to the UN-GGIM Geodetic Questionnaire

➤ Key Findings

- 80% of all responding countries use the International Terrestrial Reference Frame (ITRF) to underpin their national coordinate datum
- Only 61% of responding countries are willing/able to freely sharing GNSS data to the global community

% of responses to Q7: How important are geodetic data and datums?



Summary of responses to the UN-GGIM Geodetic Questionnaire

- Key Findings - A UN mandate would help...
 - *Reduce government security concerns and encourage data sharing*
 - *Because we are in a tectonically active areas we need data from outside...*
 - *[To] organise geodetic community would be of great benefit*
 - *[To] convince the higher authorities of the importance of geodetic infrastructure*



Status of the Asia Pacific Regional Height System Unification (APRHSU) Project

- The objective of the APRHSU project:
 - to encourage data sharing and facilitate technical exchange towards height system development in the Asia-Pacific region
- A questionnaire on the current status of the height system in the countries of the Asia-Pacific region has been developed and distributed, see <http://www.un-ggim-ap.org/wg/wg1.htm>



Steering Committee of APRHSU

- The steering committee are organized to support the methodology, standardization, and guidelines, etc.
 - Dr. John Dawson (Geoscience Australia, Australia)
 - Prof. Will Featherstone (Curtin University of Technology, Australia)
 - Dr. Yuki Kuroishi (Geospatial Information Authority of Japan, Japan)
 - Dr. Wen Hanjiang (Chinese Academy of Surveying and Mapping, China)
 - Prof. Kamaludin Omar (University Technology Malaysia, Malaysia)
 - Prof. Chalermchon Satirapod (Chulalongkorn University, Thailand)
 - Dr. Ibnu Sofian (Gravity Field and Tidal Division Badan Informasi Geospasial, Indonesia)



Status of APRHSU Questionnaire

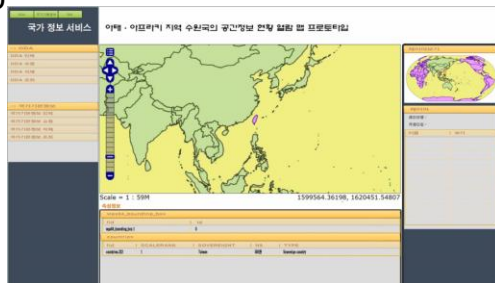
- The contents of the APRHSU questionnaire are about vertical datum, vertical positioning and vertical control network
- Twelve responses by now:
 - Australia, Azerbaijan, Bangladesh, Brunei, China, Hong Kong, Macao, Malaysia, Mongolia, Japan, Iran, Philippines
 - All responses are from government agencies or organizations responsible for the vertical reference control

Initial Analysis on APRHSU Questionnaire

- 9 out of 12 responded that the vertical datum is based on the tidal observation (2 from neighboring country, 1 with geoid)
- 10 out of 12 responded that two or more kinds of height (orthometric, ellipsoidal, normal height) are being used
- 6 out of 12 are measuring gravity and 9 uses GNSS measurement for vertical control
- 6 out of 12 has the standardized format for vertical product

Future Works on APRHSU

- Re-distribute and Analysis of the questionnaire
- Development of an optimal methodology for height unification
- Development of standards for vertical system
- Development of a web-based Map for accessing products from APRHSU



Thank you for your attention..