

Report of UN-GGIM-AP WG1 - Geodetic Reference Frame

Canberra, Australia
November, 2019



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UN-GGIM-AP Working Group 1

- Geodetic reference frame -

Content

- WG1 Activities
- WG1 session 3rd November 2019
- Resolution for UN-GGIM-AP 8th Plenary



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- Geodetic reference frame -

Chair

Mr. Basara Miyahara, Japan

Vice Chairs

Dr. John Dawson, Australia

Dr. Yamin Dang, China

Dr. Suresh Kumar Singh, India

Dr. Mohd Yunus Bin Mohd Yusoff, Malaysia

Ms. Dalkhaa Munkhtsetse, Mongolia

Mr. Graeme Blick, New Zealand

Dr. Sangoh Yi, Republic of Korea



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UN-GGIM-AP Working Group 1 – Focus 2018 - 2021

**UN-GGIM
Geodesy**



**Regional Height
System
Unification**

**Regional
Reference Frame
(APREF, APRGP)**

**Regional
Capacity
Building**



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UN-GGIM GGRF Subcommittee on Geodesy

- August 2016: the UN-GGIM Committee of Experts decided to transition the **Global Geodetic Reference Frame (GGRF)** Working Group into a permanent UN-GGIM Subcommittee on Geodesy (SCoG)
- The SCoG membership includes:
 - 40 voting members nominated by the regional UN-GGIM Executives, ensuring geographically distributed membership
 - Associate Members (non-voting) including IAG, FIG and other Member States not included in the 40 above
 - Observers (non-voting)



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UN-GGIM GGRF Subcommittee on Geodesy

- Co-chairs:
Australia (Gary Johnston),
Russia (Alexey Trifonov)
- Working Groups:
 - Geodetic Infrastructure (Zuheir Altamimi, France)
 - Policy, Standard and Convention (Mike Cramer, Canada)
 - Education, Training Capacity Building (Mikael Lilje, Sweden)
 - Outreach and Communication (Anne Jørgensen, Norway)
 - Governance (Laila Løvhøiden, Norway)



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UN-GGIM GGRF Subcommittee on Geodesy

- Asia-Pacific members:
Australia, China, Fiji, Islamic Republic of Iran, Japan, Kyrgyzstan, Malaysia, New Zealand, Philippines, and the Republic of Korea
- While these 10 countries are the official members, all other Asia Pacific Member States are invited and encouraged to participate in committee activities as associate members.



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UN-GGIM GGRF Subcommittee on Geodesy

- The 1st inaugural meeting of the Subcommittee on Geodesy was held in Mexico City on November 2017.
- The 2nd meeting was held in China on November 2018.



- The 3rd meeting will be held in UK on 20-22 April 2020 in conjunction with UN-GGIM 6th High Level Forum / Cambridge Conference 2020.



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Asia Pacific Reference Frame (APREF)

- Regional geodetic reference frame
- Realized by continuous GNSS observation of over 600 stations
- 28 countries
- Densify ITRF and improve access to ITRF
- Data are routinely processed by three Local Analysis Centres*
- Station coordinates made available publically

* Geoscience Australia
Office of Surveyor-General Victoria, Australia
Institute of Geodesy and Geophysics, Chinese Academy of Sciences



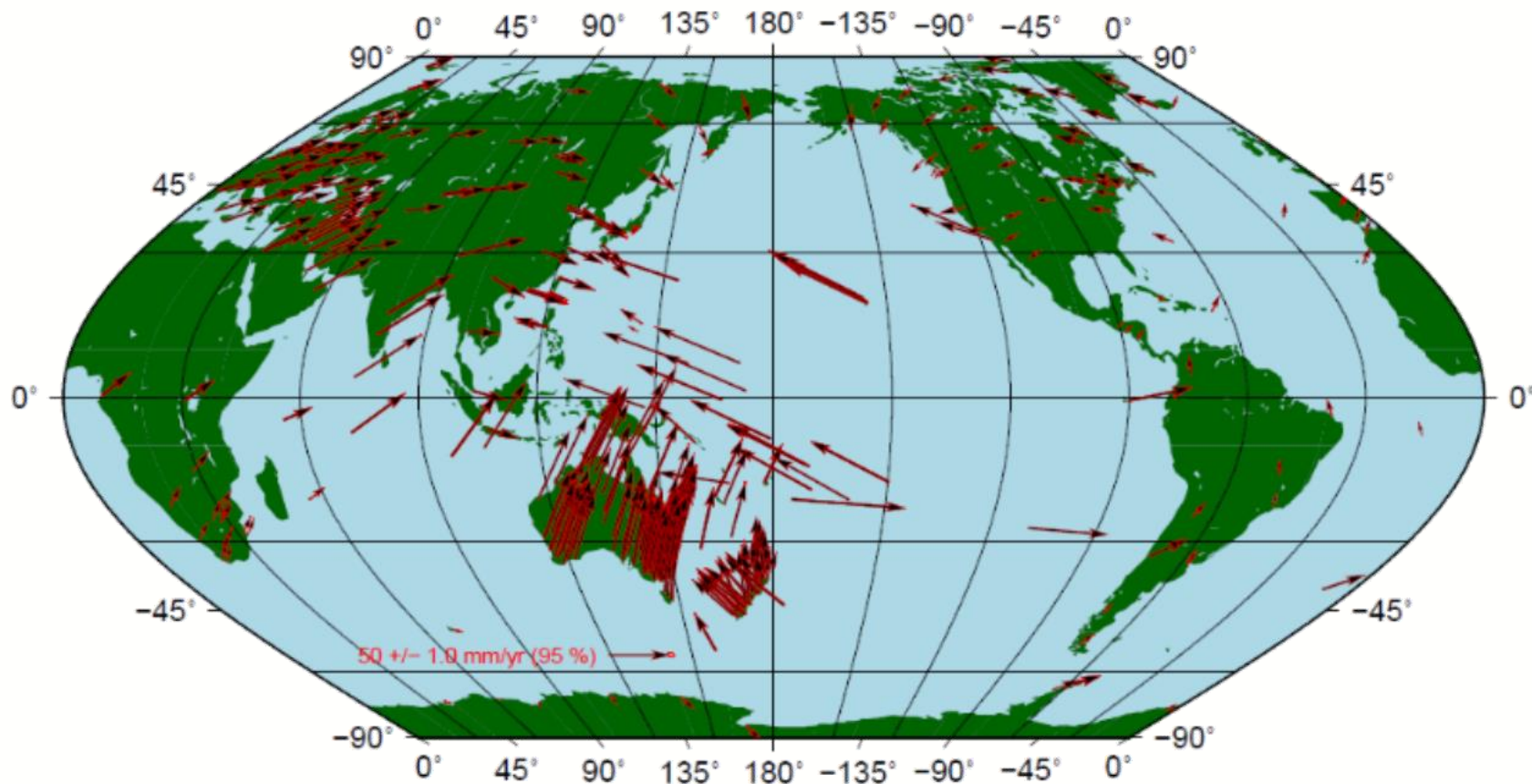
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Asia Pacific Reference Frame (APREF)



The velocity field for the APREF CORS network

G. Hu, M. Moore and J. Dawson (2016): An Update on the Asia Pacific Reference Frame (APREF)



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Asia Pacific Regional Geodetic Project (APRGP)

- Annual GNSS campaign
 - Densify ITRF and improve access to ITRF
 - Data are analysed by Geoscience Australia
 - Analysis report is distributed each year
-
- **APRGP 2018:** 16 to 22 September 2018
 - Participation from Bangladesh, Hong Kong, Indonesia, Japan, Kyrgyzstan, Laos, Malaysia, Mongolia, Philippines and Vietnam
-
- **APRGP2019:** 15 to 22 September 2019
 - Processing by Dr. Hu Guorong, Geoscience Australia



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Asia Pacific Regional Geodetic Project 2018

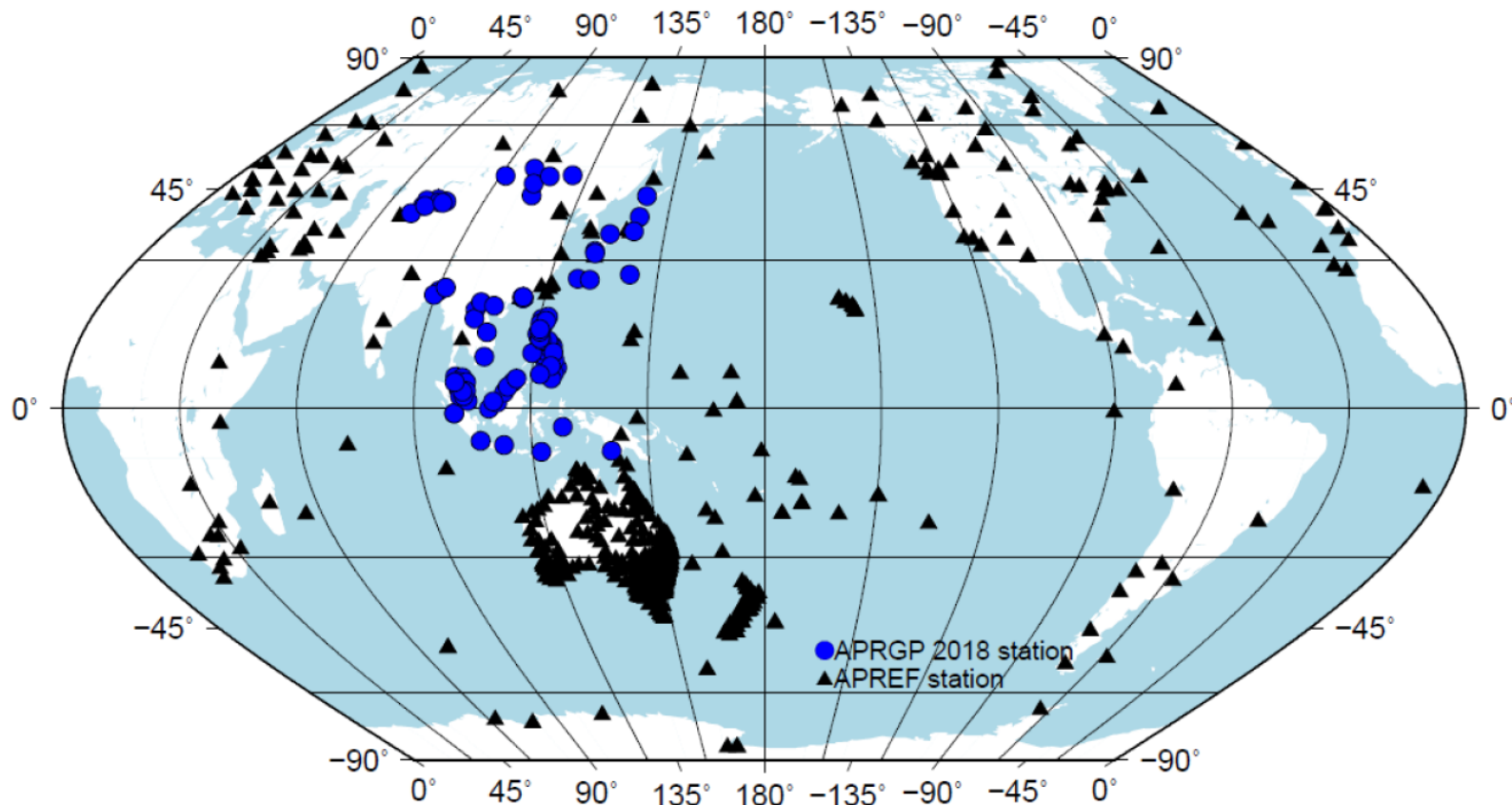


Figure 1 APRGP stations in the APRGP 2018 GPS campaign analysis along with the APREF stations and IGS stations.

Report on the Analysis of the Asia Pacific Regional Geodetic Project (APRGP) GPS Campaign 2



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Regional Height System Unification (APRHSU)

- Questionnaires on current height system of each member countries
- Analyse the answers to understand current situation
- Planning next actions based on analysis
 - Ex. Evaluate difference in height system among Asia-Pacific countries
 - Compute averaged height reference surface among Asia-Pacific countries



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Capacity Building Workshops

- Hosting and participating in capacity building workshops on geodetic reference frame, positioning and etc. in Asia-Pacific
- Collaboration with International Federation of Surveyors (FIG) Asia Pacific Capacity Development Network (AP CDN) and Commission 5, International Association of Geodesy (IAG), UN-GGIM Subcommittee on Geodesy (SCoG) and other organizations
- Pacific Geospatial and Surveying Council (PGSC)



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Capacity Building Events after 7th Plenary session



- **Technical seminar on geodetic reference frame** jointly hosted by of the UN-GGIM-AP/FIG/ICG/VAGCRS
- **Special sessions on “Developing Capacity for Geodetic Infrastructure and Systems”** jointly organized by UN-GGIM-AP WG1/FIG AP CDN/SCoG at FIG2019



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Capacity Building Events after 7th Plenary session

- **United Nations /Fiji Workshop on the Applications of Global Navigation Satellite Systems** in Suva, Fiji on June 2019



- **Positioning and GNSS CORS infrastructure Workshop** at South East Asia Survey Congress 2019 in Darwin, Australia, on August 2019



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Capacity Building Events in 2020

- UN International Committee on GNSS is planning another GNSS workshop in Mongolia, April 2020
- FIG Working Week 2020 in Amsterdam, May 2020
- Workshop on GNSS tsunami early warning and Geodesy4Sendai in Sendai, June 2020
- GNSS CORS Datum Service and Application Workshop in China at UN-GGIM-AP Executive Board meeting, July 2020
- LOCATE2020 in Brisbane, August 2020 (proposed)

• Other events in 2020?



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WG1 Session at UN-GGIM-AP 8th Plenary

- WG1 Forum on positioning and datum modernisation on 3rd November 2019
- Presentations on
 - WG1 activities and resolution for 8th Plenary
 - ITRF, APREF and national GRF
 - Modernisation of Geodetic Reference Frame
 - Height Unification
 - Current and future positioning infrastructure
 - Capacity Development (UN SCoG / FIG)
 - Update of geodetic infrastructure
 - ✓ Saudi Arabia (UN-GGIM Arab States WG3)
 - ✓ Indonesia
 - ✓ Bangladesh
 - ✓ Kingdom of Tonga



WG1 Session at UN-GGIM-AP 8th Plenary

Points of discussion

- WG1 activities
 - Continued collaboration with FIG, IAG and private sector
- Datum modernisation
 - How to deal with time variation of GRF
 - Driver to implement modernized datum
 - ✓ Growing demands on precise positioning
 - How to satisfy requirements of users especially newly emerging field such as autonomous driving etc.
- Capacity development
 - Available framework and networks (IGIF, FIG AP CDN)
 - Issues on data sharing such as legislation and policy etc..



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Resolution of UN-GGIM-AP WG1 - Geodetic Reference Frame

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Recommends the Member States

- Contribute to the GGRF through collaboration with SCoG
- Participation to GGOS (Global Geodetic Observing System)
- Multilateral cooperation to address infrastructure gaps and avoid duplication
- Support the adoption of the ITRF by participating in APREF and APRGP
- Support national GNSS, SLR and VLBI infrastructure



Recommends the Member States

- Support the collaboration with FIG and IAG
- Encourage open and free geodetic data sharing including real-time data
- Encourage technical capability development in geodetic reference frame, GNSS, Geoid and etc.
- Encourage participation to communication and outreach activities
- Host and participate in capacity building workshops in AP

