

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

4th plenary meeting of
the Subcommittee on Geodesy
Bonn, Germany
March 20, 2024



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UN-GGIM-AP Working Group 1 - Geodetic reference frame -

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Mr. Basara Miyahara, Japan

Vice Chairs

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Dr. Yamin Dang, China

Mr. Asakaia Tabua, Fiji

Mr. Upendra Nath Mishra, India

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Mr. Graeme Blick, New Zealand <- Nic Donnelly

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UN-GGIM-AP Working Group 1 – Focus 2022 - 2024

**UN-GGIM
Geodesy**



**International
Height Reference
Frame (IHRF)**

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

**Regional
Capacity
Building**



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Asia Pacific Reference Frame (APREF)

- Regional geodetic reference frame
- Joint project between IAG & UN-GGIM-AP (IAG SC 1.3e)
- Realized by continuous GNSS observation of over **700 stations**
28 countries
- Densify ITRF and improve access to ITRF
- Data are routinely processed by three Local Analysis Centres*
- Station coordinates made available publically

- Report on APREF available at

<https://www.un-ggim-ap.org/wg/working-group-1-geodetic-reference-frame>

- * Geoscience Australia
Office of Surveyor-General Victoria, Australia
Institute of Geodesy and Geophysics, Chinese Academy of Sciences
Geospatial Information Authority of Japan (under evaluation)



Asia Pacific Reference Frame (APREF)

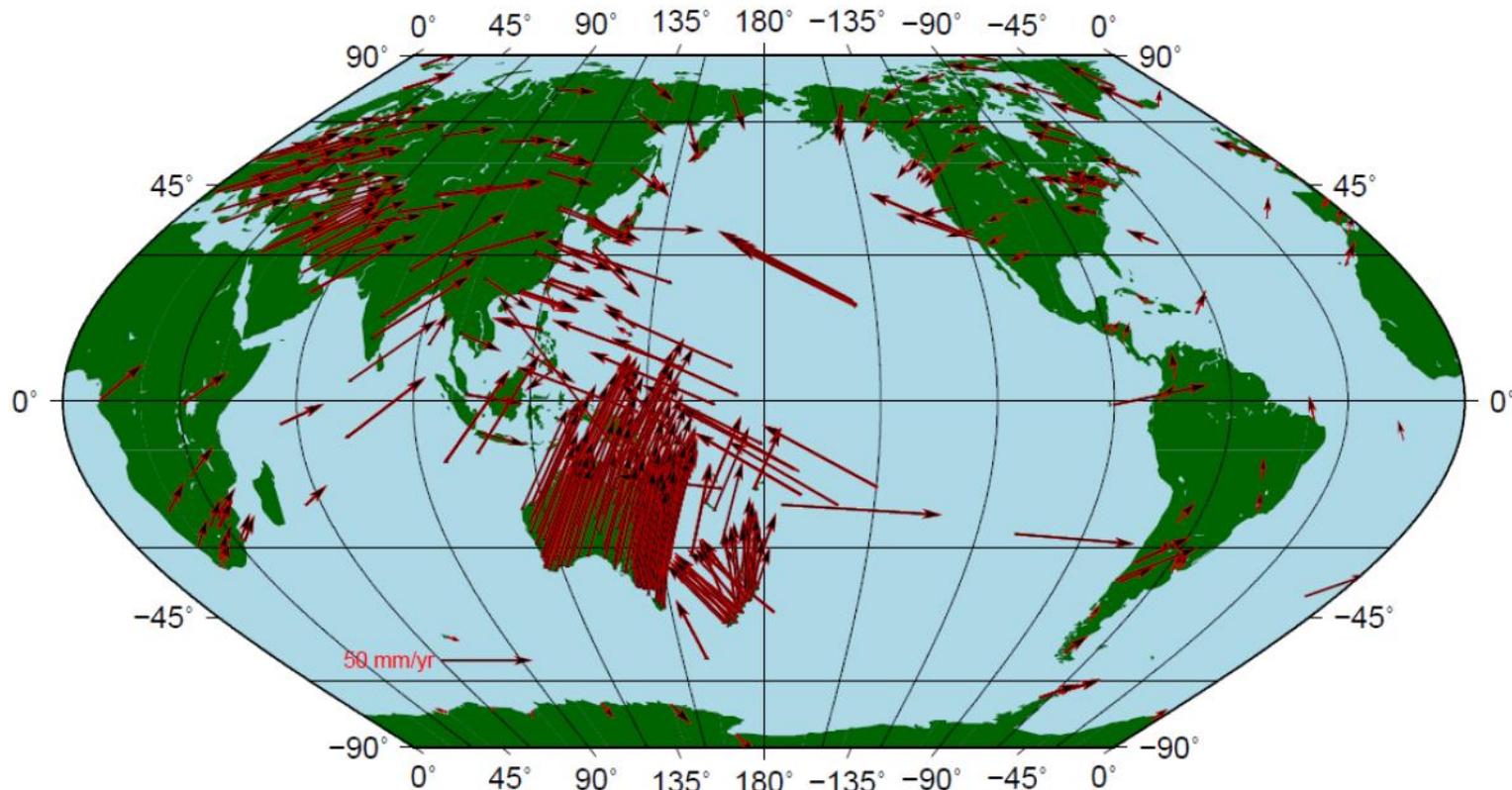


Figure 1. The distribution of APREF CORS network along with the IGS core stations. The arrows represent the GPS-derived velocity field.

G. Hu, M. Jia and J. Dawson (2019): Report on the Asia Pacific Reference Frame (APREF) Project



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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 2022:** 11 to 18 September 2022
- Under processing by Guorong Hu, Geoscience Australia
- Final report is available at UN-GGIM-AP website
<https://www.un-ggim-ap.org/wg/working-group-1-geodetic-reference-frame>

- **APRGP2023:** 10 to 16 September 2023
- Under processing by Guorong Hu, Geoscience Australia
- Data submitted by India, Korea (Republic of), Laos, Mongolia, Philippines, Singapore, Tonga and Vietnam



Asia Pacific Regional Geodetic Project 2022

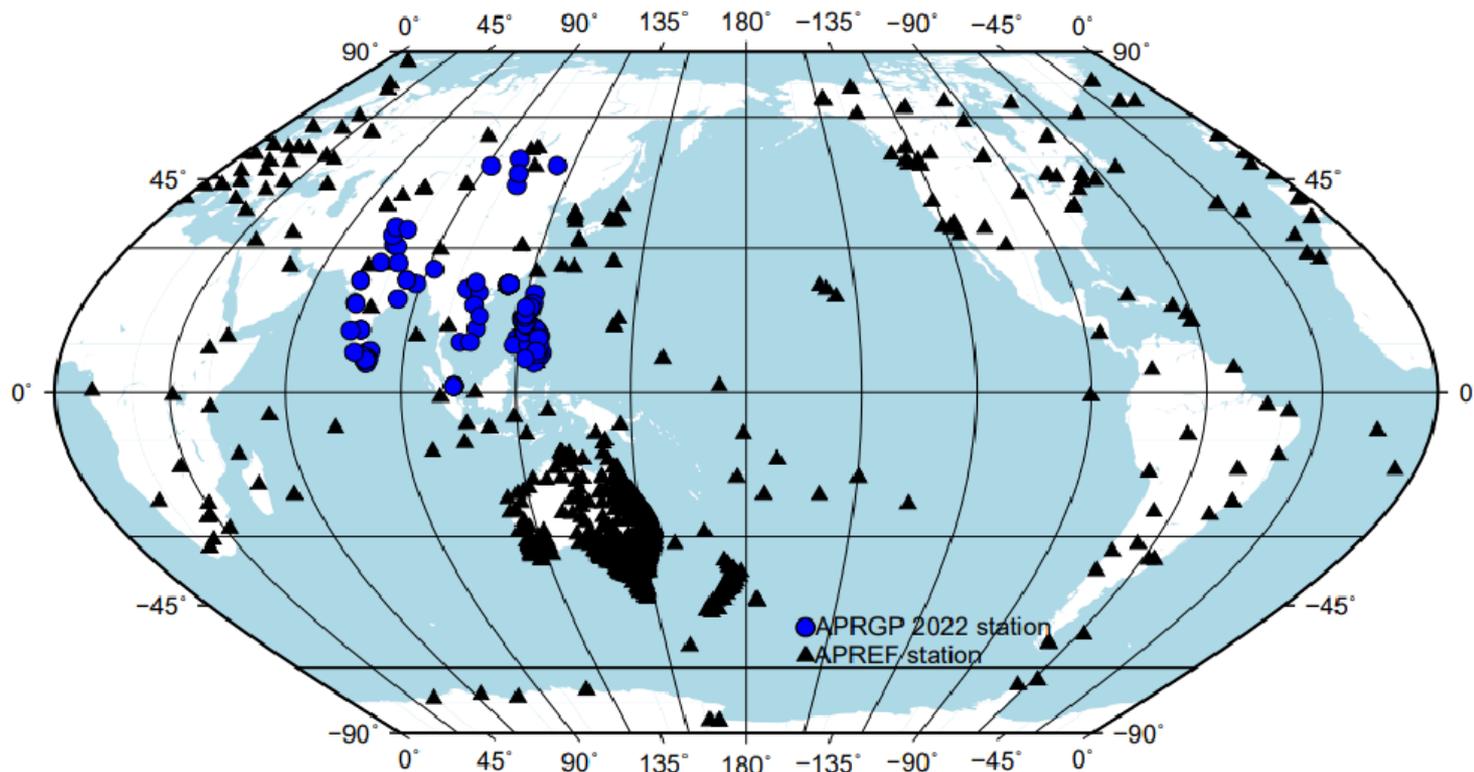


Figure 1 APRGP stations in the APRGP 2022 GPS campaign analysis along with the APREF stations and IGS stations, blue circles are APRGP campaign sites, and black triangles are APREF stations.

G. Hu: Report on the Analysis of the Asia Pacific Regional Geodetic Project (APRGP) GPS Campaign 2022



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Asia Pacific Geospatial Forum – Bali, Indonesia



The banner features a light beige background with a green and blue landscape illustration on the right. At the top left is the Asia Pacific Geospatial Forum logo, a stylized flower with four petals in red, yellow, green, and blue. To its right is the text "ASIA PACIFIC GEOSPATIAL FORUM". Further right are logos for the Ministry of Agriculture, Forestry and Spatial Planning of the National Land Agency, the Ministry of National Development Planning/Research, Republic of Indonesia, BADAN INFORMASI GEOSPASIAL, UN-GGIM, and UN-GGIM-AP. A central illustration of a traditional Indonesian pagoda is on the left. The main text reads "EMBRACING GEOSPATIAL INNOVATION FOR SUSTAINABLE WORLD" in large white letters, followed by "6TH - 10TH NOVEMBER 2023" and "DISCOVERY KARTIKA PLAZA HOTEL - BALI, INDONESIA".

- UN-GGIM-AP Workshop on Geodetic Reference Frames and Applications for Disaster Workshop
- UN-GGIM-AP 12th Plenary Meeting
 - UN-GGIM-AP Working Group on Geodetic Reference Frame Annual Session



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UN-GGIM-AP Workshop on Geodetic Reference Frames and Applications for Disaster

- Co-organized by UN-GGIM-AP/IAG/FIG/BIG
- 30 participants from 12 countries



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UN-GGIM-AP Workshop on Geodetic Reference Frames and Applications for Disaster

- Presentations
 - IAG (Geodesy for disasters, dynamic TRF, regional TRF (APREF))
 - FIG (Geodetic Capacity Development)
 - Case study (Australia, Fiji, Indonesia, Japan, Tonga)
 - GNSS enhancement to Early Tsunami Warning System (GeTEWS Oceania, Japan)
 - UN-GGCE Geodetic Need Assessment



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UN-GGIM-AP Working Group 1: Geodetic Reference Frame

Annual session at 12th Plenary of UN-GGIM-AP

- 14 participants from 10 countries, IAG and FIG
- Report of WG1, focus of WG1 for coming year
- Country report from WG members, Australia, Indonesia, Fiji, Mongolia, Singapore, Timor Leste, Tonga, Korea (Republic of)
- Findings on common interests and challenges:
 - ✓ Climate change, height system, monitoring of heights by geodetic techniques
 - ✓ Crustal deformation monitoring, dynamics of geodetic reference frame
 - ✓ Private CORS, how to share GNSS CORS data between public and private sector
 - ✓ Capacity development needs



UN-GGIM-AP Working Group 1: Geodetic Reference Frame Resolution to 12th Plenary of UN-GGIM-AP

Recommendations

- a. **Contribution to the GGRF** through close collaboration with the Subcommittee on Geodesy and GGCE
- b. Adopt **ITRF**, densify ITRF through **APREF**
- c. Support national **GNSS, SLR, and VLBI infrastructure**
- d. Work with **IAG/FIG**
- e. Sharing of geodetic data openly and freely
- f. Developing and sharing **real-time geodetic observations**, communications and analysis to support DRR
- g. Participation to **regional initiatives to enhance utilization of geodetic data and techniques for DRR** (i.e. GeTEWS Oceania)
- h. **Development of technical capabilities** in GNSS processing, Geoid determination, crustal dynamics and deformation modelling, etc.
- i. Support participation of geodetic experts to **regional geodetic forums**

Chapter 4 – UN-GGIM-AP 12th Plenary Resolution

<https://un-ggim-ap.org/sites/default/files/media/docs/Resolution-of-12th-Plenary-meeting-UN-GGIM-AP.pdf>



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GeTEWS Oceania

- Initiative to promote GNSS as an additional tool of existing Early Tsunami Warning System in Oceania
- Will coordinate regional geospatial monitoring for geohazards with a focus on rapid detection of tsunamis using a real time GNSS network and analysis systems
- UN-GGIM-AP adopted resolution in 2023 to encourages the Member States participate in the GTEWS Oceania
- The Pacific Geospatial and Surveying Council will host **the GeTEWS Oceania 2024 Implementing Workshop - Suva, Fiji in November 4-8, 2024**

For more details, review the Presentation of Folau and D'Anastasio

(UN-GGIM-AP Workshop on Geodetic Reference Frames and Applications for Disaster)

[https://docs.google.com/presentation/d/1_smN5w-](https://docs.google.com/presentation/d/1_smN5w-UU_E88qjwqJ9vxnOIDgQoG6cx/edit?usp=drive_link&oid=115161095341660637784&rtpof=true&sd=true)

[UU_E88qjwqJ9vxnOIDgQoG6cx/edit?usp=drive link&oid=115161095341660637784&rtpof=true&sd=true](https://docs.google.com/presentation/d/1_smN5w-UU_E88qjwqJ9vxnOIDgQoG6cx/edit?usp=drive_link&oid=115161095341660637784&rtpof=true&sd=true)



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UN-GGIM-AP Working Group 1: Geodetic Reference Frame Meetings in 2024

- UN-GGIM-AP Executive Board Meeting, May 6th, Sydney, Australia
(in conjunction with Locate24)
- The GeTEWS Oceania 2024 Implementing Workshop in November 4-8, 2024 Suva, Fiji
- UN-GGIM-AP 13th Plenary Meeting, November 2024, India
 - ✓ Working Group Annual Session
 - ✓ WG/IAG/FIG Workshop on geodetic capacity development



Chapter 4 – UN-GGIM-AP 12th Plenary Resolution

<https://un-ggim-ap.org/sites/default/files/media/docs/Resolution-of-12th-Plenary-meeting-UN-GGIM-AP.pdf>

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