

UN-GGIM-AP WG1 - Geodetic Reference Frame – Annual Report

UN-GGIM-AP 12th Plenary Meeting
Bali, Indonesia
November 9, 2023



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Global Geospatial Information Management

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

Chair

Mr. Basara Miyahara, Japan

Vice Chairs

Dr. Guorong Hu, Australia

Dr. Yamin Dang, China

Mr. Asakaia Tabu, Fiji

Mr. Upendra Nath Mishra, India

Mr. Sidik Tri Wibowo, Indonesia

Mr. Seyed Abdoreza Saadat Mirghadim, Islamic Republic of Iran

Mr. Ahmad Sanusi bin Che Cob, Malaysia

Ms. Dalkhaa Munkhtsetse, Mongolia

Mr. Graeme Blick, New Zealand

Mr. Jongsin Lee, Republic of Korea



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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UN-GGIM GGRF Subcommittee on Geodesy

- Established in August 2017
- Working on sustaining the UN General Assembly Resolution, **“the Global Geodetic Reference Frame (GGRF) for sustainable development”**
- The 3rd meeting in Bonn, Germany on 29 - 31 March 2023
- In conjunction with Opening Ceremony of the United Nations **Global Geodetic Centre of Excellence (GGCE)** on 29 March 2023



<https://un-ggim-europe.org/news/important-milestone-in-the-journey-for-global-geodesy/>



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UN-GGIM GGRF Subcommittee on Geodesy

- Co-chairs: Fernand Bale (Côte d'Ivoire) <- Nick Brown (Australia)
Johannes Bouman (Germany)
- Nomination of SCoG members from UN-GGIM-AP
 - ✓ Australia, China, India, Indonesia, Japan, Russian Federation, Fiji, New Zealand, Mongolia, Republic of Korea
- Restructuring of Working Groups:
 - ✓ Global Geodesy Needs Assessment (Zuheir Altamimi)
 - ✓ State of Geodesy Report (Cahir Laila)
 - ✓ Capacity Building and Education



UN Global Geodetic Center of Excellence (GGCE)

- Head: Nick Brown
- Staff members: Sarah Kowal, Jan Dostal (Germany), Anne Jorgensen (Norway, virtual) ...
- Start consultation with countries and geodetic community
 - ✓ **“Listening World Tour”**, virtual meeting with stakeholders to understand how GGCE can assist people
 - ✓ With IAG, November 28th 2023
 - ✓ With **UN-GGIM-AP**, January 24th 2024 ...
- Future meetings:
 - ✓ International Advisory Committee of the UN-GGCE in Bonn, March 2024
(probably with the 4th Subcommittee meeting)

Please keep the date!



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Asia Pacific Reference Frame (APREF)

- Regional geodetic reference frame
- 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



Asia Pacific Reference Frame (APREF)

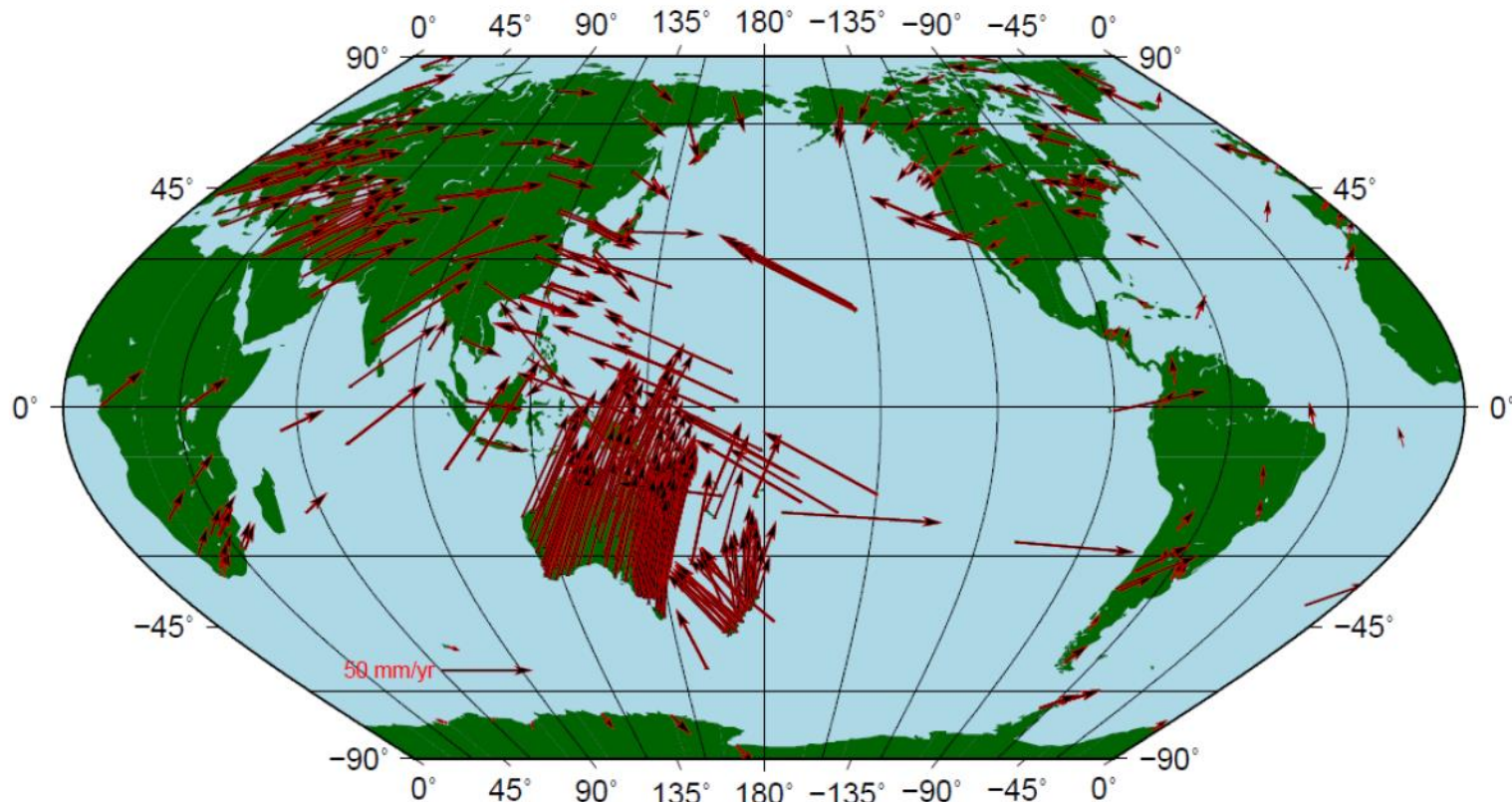


Figure 1. The distribution of APREF CORS network along with the IGS core stations. The arrows represent the GPS-derived velocity field.

G. Hu, M. Moore 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
- Processed 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 Korea (Republic of), Laos, Mongolia, Singapore, and Vietnam so far



Asia Pacific Regional Geodetic Project 2022

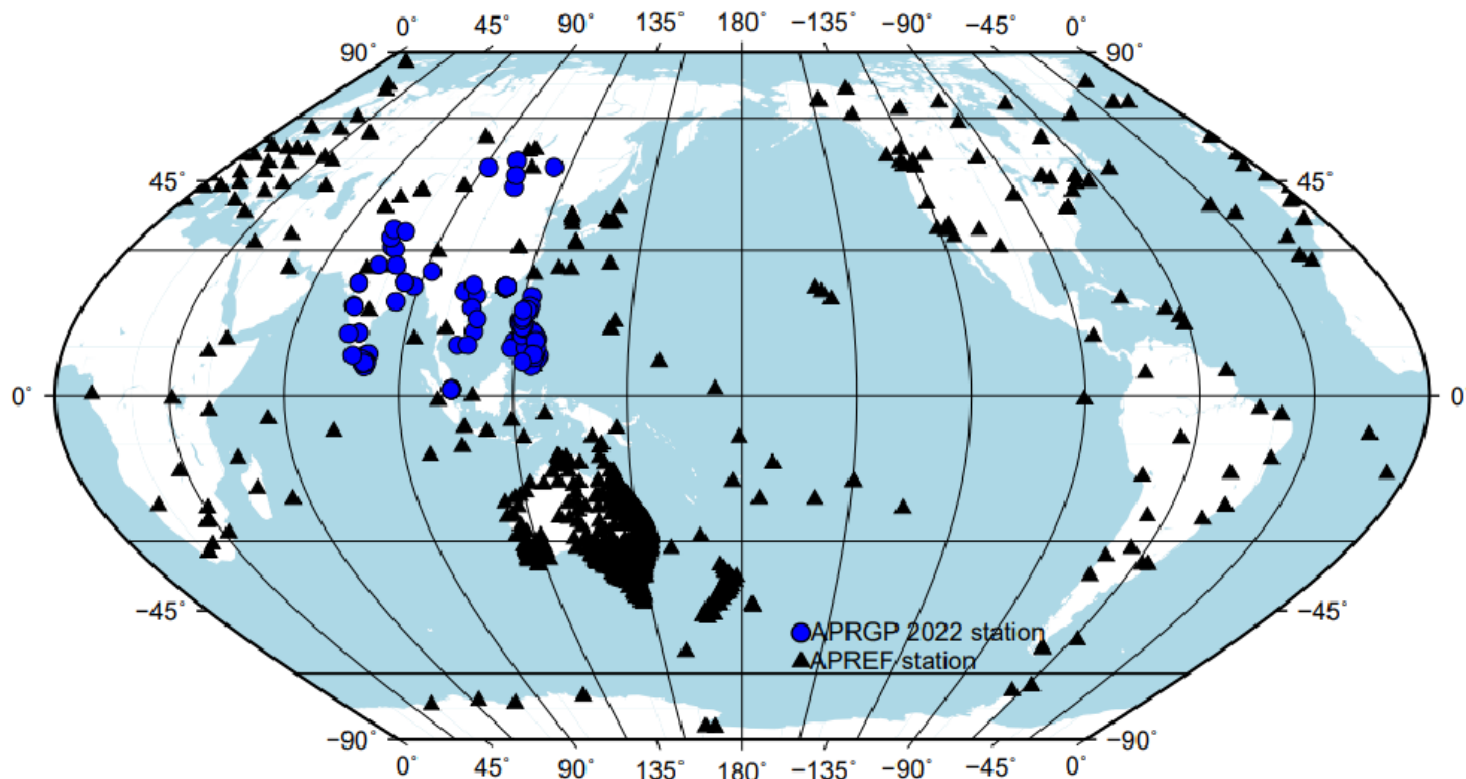


Figure 1 APRGP stations in the APRGP 2022 GPS campaign analysis along with the APREF stations and IGS stations, blue circles are APRGP campaign sites, and black triangles are APREF stations.

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



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International Height Reference Frame (IHRF)

- Global Geodetic Observing System (GGOS) Focus Area: Unified Height System has been working to establish International Height Reference Frame (IHRF)
- Evaluation of IHRF has been completed by international geoid evaluation, “Colorado Experiment”
- The first operational product center of IHRF will be launched
- IHRF related geodetic capacity development such as sharing of knowledge and expertise could be one of focus of WG1 in this term



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Capacity Building Opportunities in 2023-

- UN-GGIM-AP/IAG/FIG/BIG Workshop on Geodetic Reference Frames and Applications for Disaster on November 7th 2023 in Bali, Indonesia
- WG1 annual session at the UN-GGIM-AP 12th Plenary on November 9th 2023 in Bali, Indonesia
- FIG seminar “Reference Frame in Practice” at FIG2024?
- PGSC meetings (ex. GETWS Oceania meeting in Suva, 2024)
- Subcommittee on Geodesy and Global Geodetic Center of Excellence in Bonn, Germany on March 2024
- Other opportunities?



UN-GGIM-AP WG1 - Geodetic Reference Frame – Work Plan

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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:
 - ✓ Climate change, height system, monitoring of heights b 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



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UN-GGIM GGRF Subcommittee on Geodesy UN Global Geodetic Center of Excellence (GGCE)

- Continue to participate in and work closely with the Subcommittee and GGCE
- Continue to consult with GGCE
 - ✓ “Listening World Tour”, virtual meeting on January 24th 2024
- Participate in the meeting of the Subcommittee and GGCE
 - ✓ Inaugural meeting in Bonn, Germany on March 2024
 - ✓ Informal meeting in NY, August 2024



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Asia Pacific Reference Frame (APREF)

Asia Pacific Regional Geodetic Project (APRGP)

- Continue realization and densification of Regional geodetic reference frame by APREF and APRGP
- Encourage member countries to participate in continuous and campaign GNSS observations
- Encourage members countries to contribute to the projects as data centres and/or analysis centres

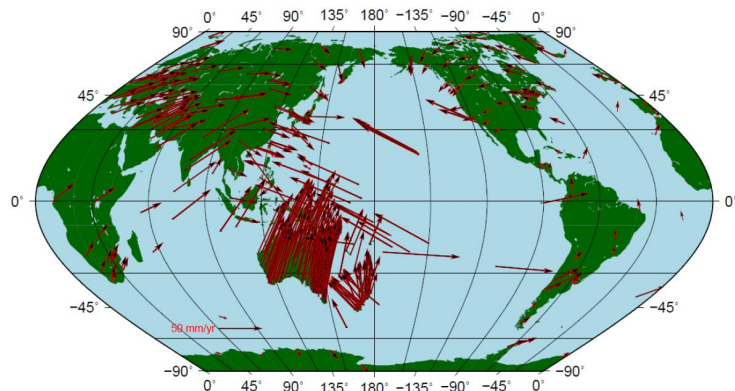


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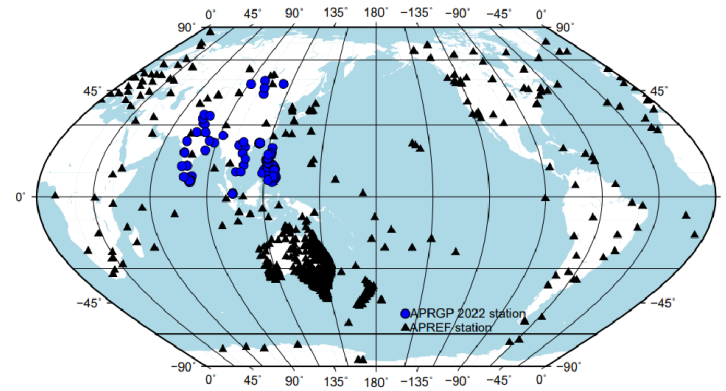


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International Height Reference Frame (IHRF)

- IHRF related geodetic capacity development such as sharing of knowledge and expertise
- Invite IHRF colleagues to events of UN-GGIM-AP WG1 for knowledge sharing



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Capacity Building Opportunities in 2023-

- Organize capacity development events in the region together with IAG, FIG and other stakeholders
- Seminar, workshop and session at the UN-GGIM-AP Plenary in 2024
- Participate in geodetic capacity development events
 - ✓ FIG seminar “Reference Frame in Practice”
 - ✓ PGSC meetings (ex. GETWS Oceania meeting in Suva, 2024)
 - ✓ Subcommittee on Geodesy and Global Geodetic Center of Excellence in Bonn, Germany on March 2024
 - ✓ Geodesy contribution to Disaster risk reduction especially GNSS Early Tsunami Warning systems (ex. GTEWS meetings)
- Other opportunities?

