

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

Ninth Plenary Meeting of
UN-GGIM-AP
November 5, 2020



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

Chair

Mr. Basara Miyahara, Japan

Vice Chairs

Dr. John Dawson, Australia

Dr. Yamin Dang, China

Mr. Shyam Veer 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
Reference Frame
(APREF, APRGP)**



**Regional Height
System
Unification**

**Regional
Capacity
Building**



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UN-GGIM GGRF Subcommittee on Geodesy

- Established in August 2017
- Working on sustaining the **Global Geodetic Reference Frame (GGRF)**
- Co-chairs: Nick Brown (Australia) <- Gary Johnston
Alexey Trifonov (Russia)
- Working Groups:
 - Geodetic Infrastructure (Zuheir Altamimi, France)
 - Policy, Standard and Convention (Nick Brown, Australia)
<- 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

- The SCoG membership includes:
 - 42 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 42 above
 - Observers (non-voting)
- 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 voting 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 meeting in Mexico City on November 2017.
- The 2nd meeting in China on November 2018.
- The 3rd meeting was held in virtual on June 18, 2020.
(Originally planned in UK on April 2020)
- ✓ Discussion on SCoG report to UN-GGIM 10th session
 - Draft Position Paper on Sustaining the Global Geodetic Reference Frame
 - Draft Concept Paper on Establishing a Global Geodetic Centre of Excellence



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UN-GGIM GGRF Subcommittee on Geodesy

Draft Concept Paper on Establishing a Global Geodetic Centre of Excellence (GGCE)

- GGCE was proposed by the SCoG as mechanism to enhance governance of sustainable GGRF in UN-GGIM 9th session in 2019.
- In 10th session, Germany proposed to establish the first GGCE at Bonn UN Campus in Germany.
- UN-GGIM request SCoG to have more consultations with the Member States and relevant geodetic stakeholders.



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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



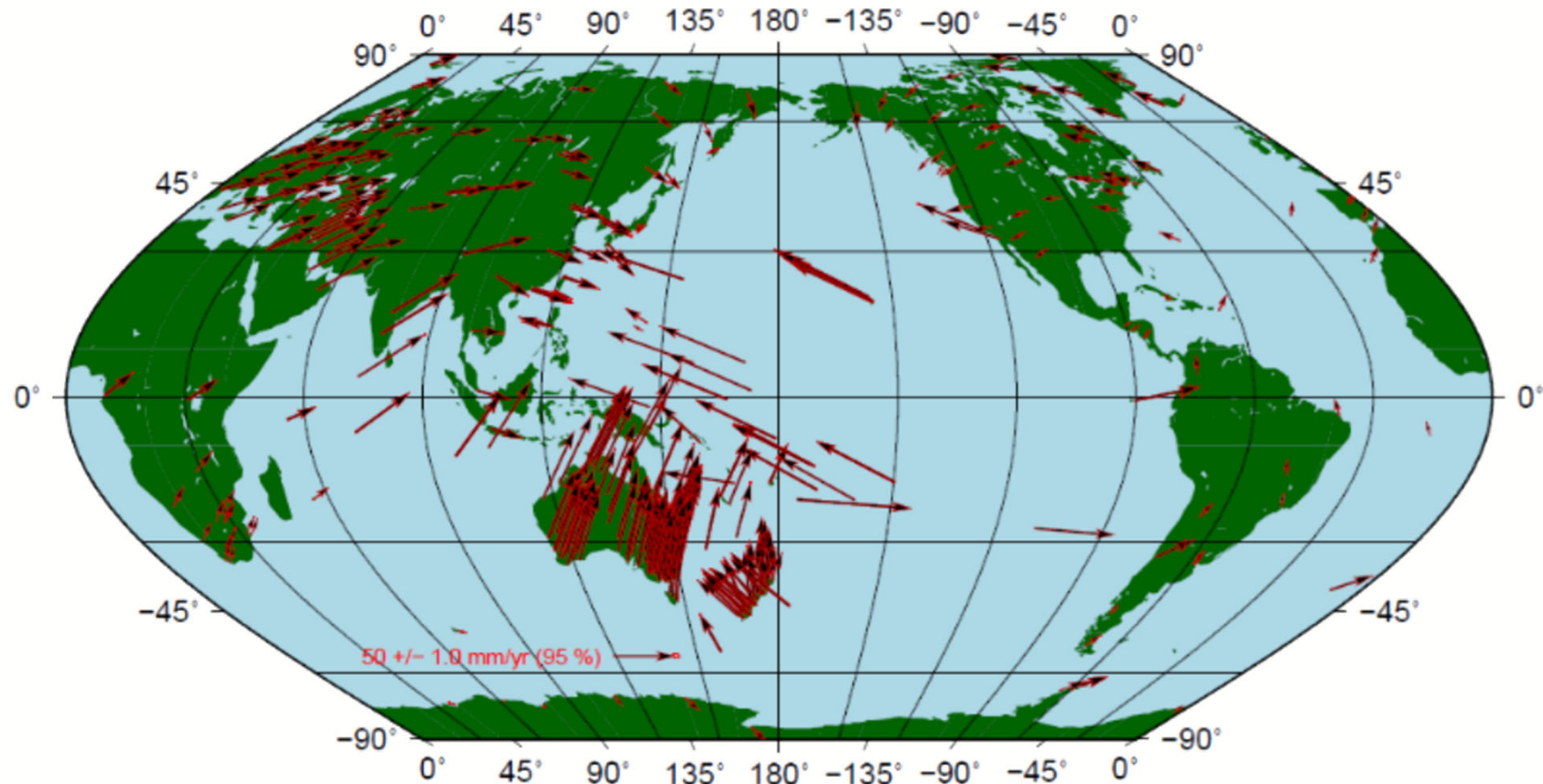
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Asia Pacific Reference Frame (APREF)



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 2019:** 15 to 21 September 2019
- Participation from 16 countries and regions*
- Processed by Dr. Guorong Hu, Geoscience Australia
- Final report is available at UN-GGIM-AP Website

- **APRGP2020:** 13 to 20 September 2020
- Processing by Dr. Guorong Hu, Geoscience Australia

* Armenia, Bangladesh, Bhutan, Brunei, Cambodia, Hong Kong SAR, India, Indonesia, Japan, Lao, Mongolia, Myanmar, Philippines, Singapore, Tonga and Vietnam



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Asia Pacific Regional Geodetic Project 2019

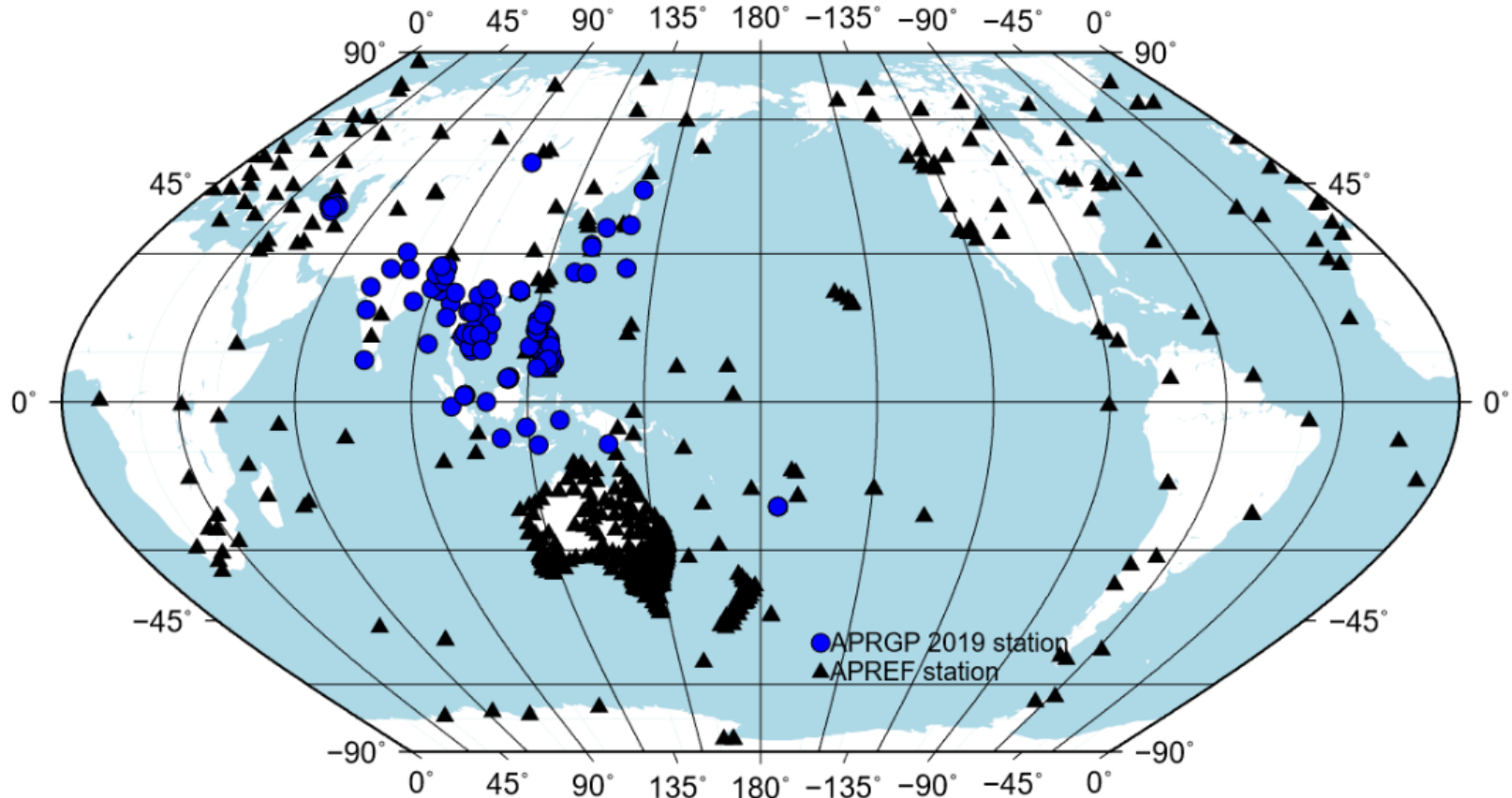


Figure 1 APRGP stations in the APRGP 2019 GPS campaign analysis along with the APREF stations and IGS stations, blue circles are APRGP campaign sites, and black triangles are APREF stations.

G. Hu: Report on the Analysis of the Asia Pacific Regional Geodetic Project (APRGP) GPS Campaign 2019



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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 Events in 2020

- Following events were planned but postponed due to the COVID-19 pandemic.
- UN-GGIM WG-Disasters Conference 2020 in Tokyo, Japan, February 2020
- UN/Mongolia Workshop on the Applications of Global Navigation Satellite Systems in Mongolia, April 2020
- FIG Working Week 2020 in Amsterdam, May 2020
-> June 2021 in virtual
- Workshop on GNSS tsunami early warning and Geodesy4Sendai in Sendai, Japan, June 2020
-> 2021 in Sendai



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

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Recommends the Member States

- a) Contribute to the GGRF through collaboration with SCoG
- b) Participate in the consultation of two GGRF documents prepared by SCoG**
 - Draft Position Paper on Sustaining the **Global Geodetic Reference Frame (GGRF)**
 - Draft Concept Paper on Establishing a **Global Geodetic Centre of Excellence (GGCE)**
- c) Support the adoption of the ITRF by participating in APREF and APRGP
- d) Support national GNSS, SLR and VLBI infrastructure



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Recommends the Member States

- e) Support the collaboration with FIG and IAG
- f) Encourage open and free geodetic data sharing
- g) Encourage sharing of real-time geodetic observation
- h) Encourages modernization of data sharing legislations and policies
- i) Encourage technical capability development in geodetic reference frame, GNSS, Geoid and etc.
- j) Encourage participation to communication and outreach activities



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