

GNSS ENHANCEMENT TO TSUNAMI EARLY WARNING SYSTEMS (GTEWS):

THE VISION, ACTIVITY, ACCOMPLISHMENTS

INTERNATIONAL ASSOCIATION OF GEODESY AND GEOPHYSICS
INTERNATIONAL ASSOCIATION OF GEODESY

GGOS Coordinating Board 2022: Geohazard Focus Area Report
John LaBrecque

VISION FOUNDATIONS



- 2015 IUGG General Assembly Resolution #4 calls for the development of an Indo-Pacific effort to implement GTEWS
- 2016 GGOS issues CfP for GATEW Working Group
- 2017 The GTEWS 2017 workshop reviewed the maturity and utility of GTEWS and provided recommendations for its development.
- 2019 GTEWS 2017 report published by the [Global Assessment Report for 2019](#) of the UN Office for Disaster Risk Reduction and by the [Association of Pacific Rim Universities](#). These reports validate that GTEWS is effective and affordable providing tsunami risk reduction and broad economic benefits to both developing and developed nations. GTEWS 2017 workshop recommendations begin with the establishment of a [GTEWS Consortium of Principals](#).
- 2020, 2021 & 2022 Planning and preparations for GTEWS Principals Organizational Meeting –the COVID delay was used to further develop the institutional and community support.



The GTEWS Vision



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The proposed GTEWS 2017 network comprises approximately 3000 GNSS, QZSS, and NavIC receivers in the Indian, Pacific, and Caribbean Basins to provide tsunami early warning through the measurement of the dynamics of the ionized and neutral atmosphere, ocean, and land.

The GTEWS Network will utilize machine learning and artificial intelligence to provide Disaster Risk reduction by improving early warning at a sustainable cost. The GTEWS network will also provide scientific opportunities to identify and better understand ionospheric, atmospheric, ocean, and land macroscopic dynamics.



The GTEWS Initiative



Geohazards

- The GTEWS Initiative is supported by the 18 institutions of 12 nations that comprise the GATEW working group of the GGOS Focus Area for Geohazards.
- The Group on Earth Observation Geodesy4Sendai community activity will be the forum for the implementation of the GTEWS Initiative. The GEO DRR working group 2 and is led by Allison Craddock, John LaBrecque, John Rundle, Shunichi Koshimura.
- The IUGG pledged a grant to support the planning of the GTEWS 2017 meeting of principals implementation meeting within the Geodesy4Sendai activity.
- The GGOS and the IUGG Commission of Geophysical Risk and Sustainability support the Geodesy4Sendai GTEWS Initiative.
- APRU and Tohoku University IRIDeS pledged support for the GTEWS Initiative



Organizational Meeting of GTEWS Principals: Spring 2023



Forum: GEO Geodesy4Sendai Community Activity

Goal: Creation of the GTEWS Consortium per GTEWS 2017 recommendation

- GTEWS Principals will consist of supporting organizations for the development of the GTEWS network as recommended by the GTEWS 2017 workshop.
- Initial step will be to focus on the development of an Oceania real time GNSS network for GTEWS- Oceania GTEWS.
- Oceania is the least developed regional real time GNSS capability within the Pacific Region.
- The Oceania-GTEWS will be an asset to all circum-Pacific GTEWS programs and encourage further collaboration and data sharing.
- We seek the participation the IGS, UNGGIM, and UNAVCO as principal members for the development of national and commercial collaborations.
- The IUGG has pledged \$10K to support the Meeting of GTEWS Principal.
- The IUGG GeoRisk Commission and the UC Davis also have significant resources that they might contribute.





Geohazards

THANK YOU!



ACHIEVEMENTS:



- The ITU Focus Group on AI for Natural Disaster Management (FG-AI4NDM-I-024) initiated a topic group to advance the application of Artificial Intelligence for GTEWS. (Members: A. Craddock, J. Rundle, A. Komjathy, D. Grzan, V. Constantinou, S. Krishnamoorthy)
- The ITU group's work will:
 - Improve the speed and quality of GNSS observations and improve the quality of early warning products thereby contributing to the Sendai Framework of the UNDRR.
 - Provide Ionospheric, atmospheric, ocean and geodetic science with a new tool to observe and understand geodynamics.

