



GGOS Days + SIRGAS 2019

November 12, 2019

Rio de Janeiro, Brazil

Global Geodetic Observing System External Relations Overview

Allison Craddock

Director, IGS Central Bureau and

Manager of External Relations, Global Geodetic Observing System (GGOS)



Jet Propulsion Laboratory
California Institute of Technology

© 2018 California Institute of Technology. Government sponsorship acknowledged

GGOS External Relations Overview



United Nations



The Committee on Earth Observation Satellites

Participation and Representation in External Stakeholder Organizations

- United Nations Global Geospatial Information Management (GGIM) Subcommittee on Geodesy (SCoG)
- Collaboration with UNOOSA International Committee on GNSS (ICG)
- Group on Earth Observations (GEO)
 - Programme Board participation
 - Work programme review board participation for Disasters and Cross-Cutting Activities
- Committee on Earth Observation Satellites (CEOS)

...So many acronyms!





The United Nations System

UN Principal Organs

General Assembly

Security Council

Economic and Social Council

Secretariat

International Court of Justice

Trusteeship Council⁶

Funds and Programmes¹

UNCTAD United Nations Conference on Trade and Development

- **ITC** International Trade Centre (UNCTAD/WTO)

UNDP United Nations Development Programme

- **UNCDF** United Nations Capital Development Fund

- **UNV** United Nations Volunteers

UNEP United Nations Environment Programme

UNFPA United Nations Population Fund

Subsidiary Bodies

Main and other sessional committees
Disarmament Commission
Human Rights Council
International Law Commission
Standing committees and ad hoc bodies

Subsidiary Bodies

Counter-terrorism committees
International Criminal Tribunal for Rwanda (ICTR)
International Criminal Tribunal for the former Yugoslavia (ICTY)

Military Staff Committee
Peacekeeping operations and political missions
Sanctions committees (ad hoc)
Standing committees and ad hoc bodies

Advisory Subsidiary Body

Peacebuilding Commission

Functional Commissions

Crime Prevention and Criminal Justice
Narcotic Drugs
Population and Development
Science and Technology for Development
Social Development
Statistics
Status of Women
Sustainable Development
United Nations Forum on Forests

Regional Commissions

ECA Economic Commission for Africa
ECE Economic Commission for Europe
ECLAC Economic Commission for Latin America and the Caribbean
ESCAP Economic and Social Commission for Asia and the Pacific
ESCWA Economic and Social Commission for Western Asia

Other Bodies

Committee for Development Policy
Committee of Experts on Public Administration
Committee on Non-Governmental Organizations
Permanent Forum on Indigenous Issues
United Nations Group of Experts on Geographical Names
Other sessional and standing committees and expert, ad hoc and related bodies

Departments and Offices

EOSG Executive Office of the Secretary-General
DESA Department of Economic and Social Affairs
DFS Department of Field Support
DGACM Department for General Assembly and Conference Management
DM Department of Management

DPA Department of Political Affairs
DPI Department of Public Information
DPKO Department of Peacekeeping Operations
DSS Department of Safety and Security
OCHA Office for the Coordination of Humanitarian Affairs
OHCHR Office of the United Nations High Commissioner for Human Rights

OIOS Office of Internal Oversight Services
OLA Office of Legal Affairs
OSAA Office of the Special Adviser on Africa
SRSG/CAAC Office of the Special Representative of the Secretary-General for Children and Armed Conflict
SRSG/SVC Office of the Special Representative of the Secretary-General on Sexual Violence in Conflict

UNODA Office for Disarmament Affairs
UNOG United Nations Office at Geneva
UN-OHRLS Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States
UNON United Nations Office at Nairobi
UNOV United Nations Office at Vienna

UN-HABITAT United Nations Human Settlements Programme

UNHCR Office of the United Nations High Commissioner for Refugees

UNICEF United Nations Children's Fund

UNODC United Nations Office on Drugs and Crime

UNRWA² United Nations Relief and Works Agency for Palestine Refugees in the Near East

UN-Women United Nations Entity for Gender Equality and the Empowerment of Women

WFP World Food Programme

Research and Training Institutes

UNICRI United Nations Interregional Crime and Justice Research Institute

UNIDIR² United Nations Institute for Disarmament Research

UNITAR United Nations Institute for Training and Research

UNRISD United Nations Research Institute for Social Development

UNSSC United Nations System Staff College

UNU United Nations University

Other Entities

UNAIDS Joint United Nations Programme on HIV/AIDS

UNISDR United Nations International Strategy for Disaster Reduction

UNOPS United Nations Office for Project Services

Related Organizations

CTBTO Preparatory Commission Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization

IAEA^{1,3} International Atomic Energy Agency

OPCW Organisation for the Prohibition of Chemical Weapons

WTO^{1,4} World Trade Organization

Specialized Agencies^{1,5}

FAO Food and Agriculture Organization of the United Nations

ICAO International Civil Aviation Organization

IFAD International Fund for Agricultural Development

ILO International Labour Organization

IMF International Monetary Fund

IMO International Maritime Organization

ITU International Telecommunication Union

UNESCO United Nations Educational, Scientific and Cultural Organization

UNIDO United Nations Industrial Development Organization

UNWTO World Tourism Organization

UPU Universal Postal Union

WHO World Health Organization

WIPO World Intellectual Property Organization

WMO World Meteorological Organization

World Bank Group

- **IBRD** International Bank for Reconstruction and Development

- **ICSID** International Centre for Settlement of Investment Disputes

- **IDA** International Development Association

- **IFC** International Finance Corporation

- **MIGA** Multilateral Investment Guarantee Agency

Notes:

¹ The United Nations, its Funds and Programmes, the Specialized Agencies, IAEA and WTO are all members of the United Nations System Chief Executives Board for Coordination (CEB).

² UNRWA and UNIDIR report only to the General Assembly (GA).

³ IAEA reports to the Security Council and the GA.

⁴ WTO has no reporting obligation to the GA, but contributes on an ad hoc basis to GA and Economic and Social Council (ECOSOC) work on, inter alia, finance and development issues.

⁵ Specialized Agencies are autonomous organizations whose work is coordinated through ECOSOC (intergovernmental level) and CEB (inter-secretariat level).

⁶ The Trusteeship Council suspended operation on 1 November 1994, as on 1 October 1994 Palau, the last United Nations Trust Territory, became independent.

This is not an official document of the United Nations. It is intended for informational purposes only.



UN-GGIM
UNITED NATIONS INITIATIVE ON
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT

...So many acronyms
(GGIM Subcommittee on
Geodesy and the GGRF)

UN = United Nations

UN ECOSOC = Economic and Social Council

UN-GGIM = United Nations Initiative on Global
Geospatial Information Management

- Initiative of UN - led by United Nations Member States
- Aims to address global challenges regarding the use of geospatial information

SCoG = Subcommittee on Geodesy

- Recognising the growing demand for more precise positioning services, UN-GGIM created a UN GGIM Subcommittee on Geodesy

GGRF = Global Geodetic Reference Frame

- Formulated and facilitated the Resolution for a Global Geodetic Reference Frame for Sustainable Development (UNGGRF).



Q

Documents ▾

Capacity Building Activities

ICG Timeline

Working Group D

Employment

GGOS External Relations Overview



UN World Conference on
Disaster Risk Reduction
2015 Sendai Japan

Current External Relations Projects

- Connecting United Nations Initiatives with the GGOS Geohazards Focus Area through the GAR19 Report
 - Ensures geodesy is included in globally-recognized disaster risk reduction document
- Connecting the GEO Work Program (Sendai and SDGs) United Nations Initiatives with GGOS
 - Participation in subgroups dedicated to Sendai and SEO
- Co-organizing regional workshops
- Preliminary GGOS interoperable/modular elements in support of GGIM-World Bank Integrated Geospatial Information Framework
- Group on Earth Observations Community Activity: “Geodesy for Sendai”
- GGOS Contribution to GAR 2019
- Working Group on DOIs for Geodetic Data and Products

Connecting the GEO Work Program's United Nations Initiatives with GGOS

There is tremendous potential to increase the exposure and impact of GGOS by identifying potential contributions and connecting existing relevant work to efforts in support of both **UN SDGs** and the **Sendai Framework**.

GGOS has the potential to help by:

- ❑ **Facilitating linkages** to agencies and other providers of geodetic data
- ❑ Making existing geodetic data **discoverable** and easily **accessible**
- ❑ Working toward **standardization**
- ❑ **Advocating** for geodetic data and infrastructure in relation to Earth observations and the Sendai Framework via the GEO Programme Board Subgroup on Sendai

Participation at the GEO Programme Board level ensures that IAG/GGOS efforts in alignment with GEO's global priorities (supporting the UN SDGs, Sendai Framework, as well as the Paris Agreement on Climate Change) are well supported and complimentary to other related work – as well as preventing unnecessary redundancy of work.

Supporting Sendai

Coordinating Earth Observations for Disasters

GEO supports implementation of Sendai Framework targets E,F and G through engagement with UNISDR.

E: Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020;

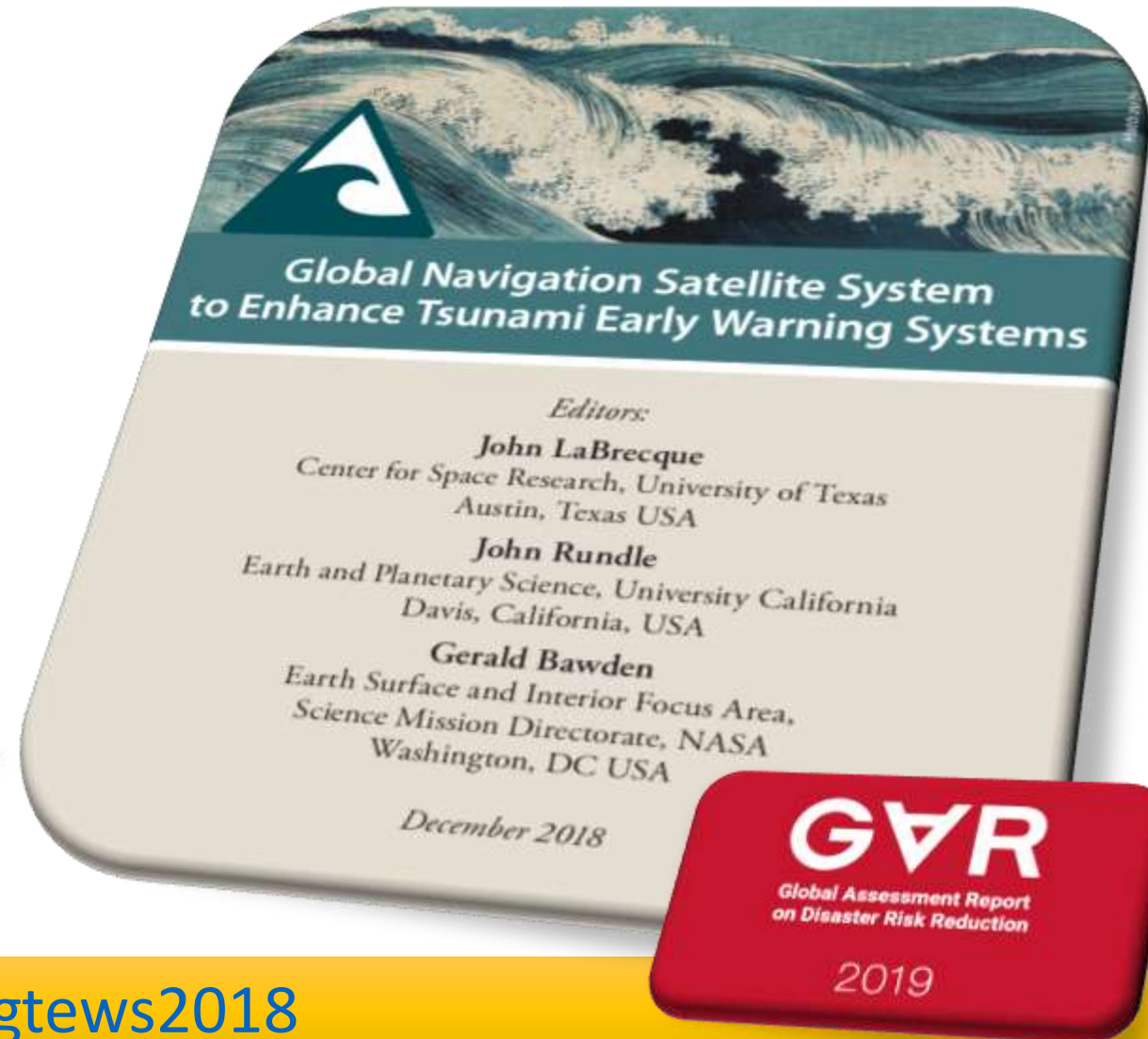
F: *Substantially enhance international cooperation to developing countries* through adequate and sustainable support to complement their national actions for implementation of the present framework by 2030;

G: Substantially increase the **availability of and access to multi-hazard early warning systems** and disaster risk information and assessments to people by 2030.

Connecting Geodesy with United Nations Initiatives : GNSS Enhanced Tsunami Early Warning Systems

Geodetic observations have a clear role in helping to reduce the risk of disasters, as well as contribute to disaster preparedness with better mitigation and response.

GGOS-Geohazards Working Group contributed content for the 2019 UN Global Assessment Report on Disaster Risk Reduction (GAR19), which is a **major UN report addressing disaster risk reduction that contributes to regional and global platforms for disaster risk reduction, as well as the high-level political forum on sustainable development**



Download GTEWS report: <http://bit.ly/gtews2018>

2017 Sendai Workshop Recommendations

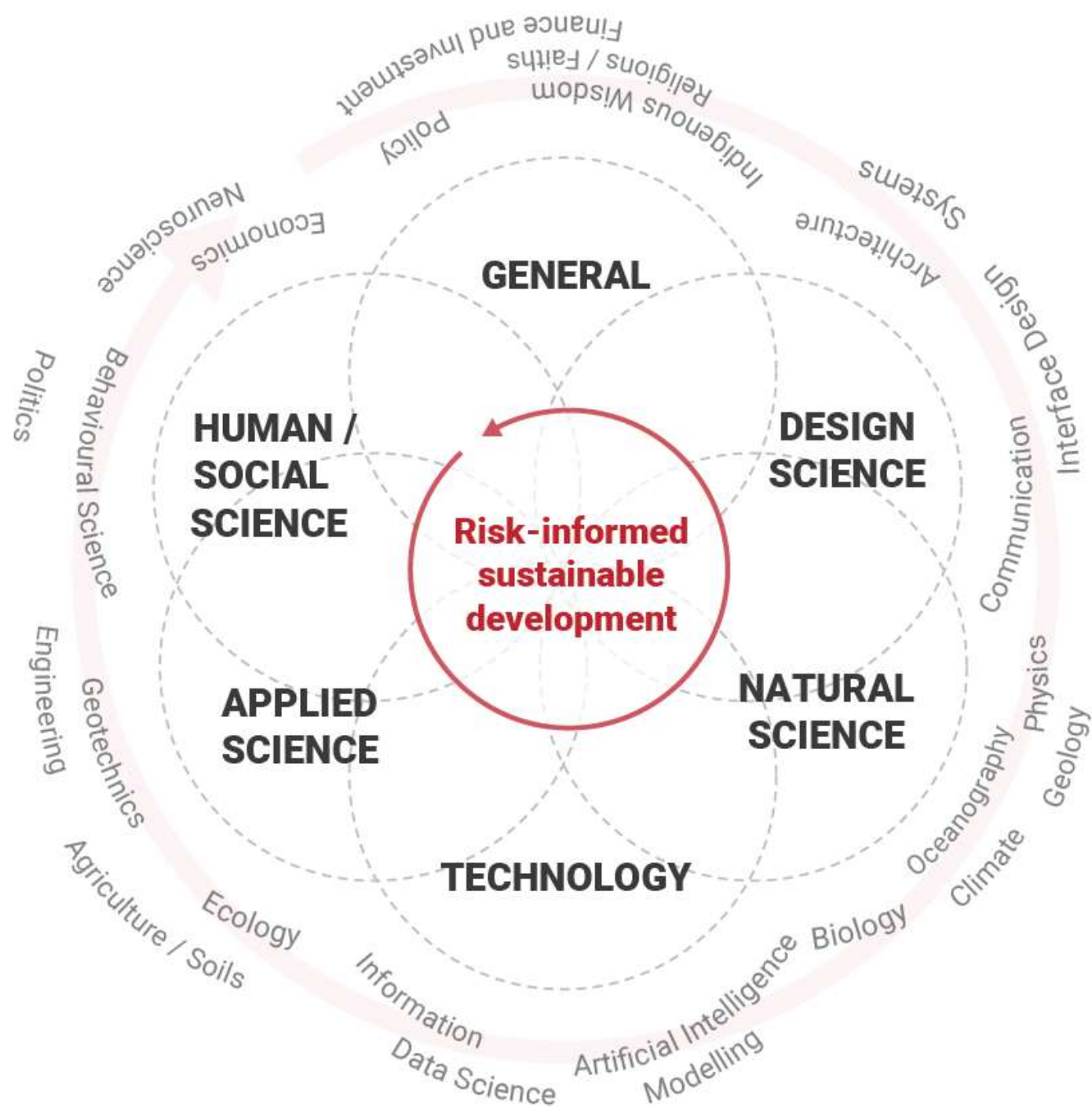
1. The GGOS/IUGG, Association of Pacific Rim Universities (APRU) and the UN-GGIM are encouraged **coordinate efforts** to develop a GNSS Shield Consortium for the Indo-Pacific.
2. The GNSS Shield Consortium should work to **encourage software, data exchange, and continued improvement of network design and performance.**
3. **Strengthen broadband communication** to underserved regions of the GNSS Shield.
4. Work with national organizations including those mandated for natural hazards mitigation to develop **agreements for [openly sharing] GNSS receivers** within the GNSS Shield.
5. Design an optimal GNSS Shield network for both **crustal displacement and high resolution TEC monitoring.**
6. Understand the operational requirements of existing tsunami warning systems and determine the steps required to **interface with existing tsunami warning systems.**

GVR

Global Assessment Report
on Disaster Risk Reduction

2019

The Global Assessment Report on DRR is a biennial snapshot contextualising progress in realising the global targets of the Sendai Framework, and contributes to the High Level Political Forum on Sustainable Development.



2.2.2

Feedback loops of asynchronous operations of system components

An adverse event affecting the functioning of an individual system component can cause reverberations or ripples within the larger system and lead to a breakdown of related system components and potentially the complete system.

Box 2.4. Systems reverberations – global navigation satellite system

In supply chains and traffic systems, applications using global navigation satellite systems – notably the global positioning system (GPS) – have been expanding exponentially, delivering innovative and efficiency-enhancing capabilities, revolutionizing the operations across entire supply chains. Efficiency gains through just-in-time delivery systems have been

remarkable in the logistics sector and also in related sectors such as financial services (e.g. settlement systems), food systems and health (e.g. manufacturing).^{*} A failure in a GPS will cause deliveries to be delayed. Order and delivery jams could cause, through positive feedback loops, the simultaneous failure of many services that are likely otherwise assumed

to be independent of each other. It is entirely plausible that the malfunctioning of a relatively small service delivery system, originally designed to assure the synchronization of

business operations reaping efficiency gains, could cause large-scale breakdown of food and health systems at local or even national or global scale.

^{*} Beneficial efficiency gains must be measured against new risks posed; for example, the potential deleterious effect of just-in-time food delivery programmes on the resilience of communities.

Global navigation satellite system enhancement for tsunami early warning systems

SOURCE(S): UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION (UNDRR)

The demonstrated early warning capability of Global Navigation Satellite Systems (GNSS) to accurately, rapidly, and cost effectively measure deformation of the Earth's surface and the response of the ionosphere to this deformation was the factual basis for the GNSS Tsunami Early Warning Systems Workshop (GTEWS) and this report. GTEWS 2017 was held in Sendai, Japan to review the principles of GNSS positioning, the geophysics of mega-thrust earthquakes, and GTEWS techniques in utilizing GNSS displacement and ionospheric imaging to advance global tsunami warning. This report explores the development history of GNSS Tsunami Early Warning Systems, their tsunami early warning technology and requirements, prototype networks, and the workshop findings and recommendations.

This paper is a contribution to the 2019 edition of the Global Assessment Report on Disaster Risk Reduction (GAR 2019).

To cite this paper:

LaBrecque, J.; Rundle, J. et al. Global navigation satellite system enhancement for tsunami early warning systems. Contributing Paper to GAR 2019

***GGOS Contributing
Paper to the GAR is
available for viewing
and download***



How do we support GNSS Enhanced Tsunami Early Warning Systems and other Geodetic Contributions to Disaster Risk Reduction + Resilience?



Geodesy for the Sendai Framework Community Activity

- Supporting geodetic development and capacity building for disaster risk reduction and resilience
- Identifies existing resources and stakeholder communities, and makes connections
- Identifies geodetic elements of targets and indicators of the Sendai Framework for Disaster Risk Reduction
- Provides opportunity for other GEO efforts to interact with geodesy community
- Integration with UN Sustainable Development Goals and UN-GGIM World Bank Integrated Geospatial Information Framework

... and more...

GTEWS/geodesy4sendai Workshop 2020



- Next GTEWS workshop, now organized as a project of the GEO Community Activity “geodesy4sendai” is in development, and scheduled to take place **June 1-5, 2020 in Sendai.**
- Organized to complement relevant sessions at JpGU-AGU 2020 (to be held one week before the workshop in Chiba, Japan)
- Followed by APRU-IRIDeS Multi-Hazards Summer School (held one week before and after the GTEWS Workshop at Tohoku University)

geodesy4sendai Next Steps

- **What does the Geodesy community need from this GEO Community Activity?**
- **What does the Disaster Risk Reduction + Resilience community need from geodesy?**
- **How can geodesists better engage with the broader Earth observation and disasters community?**
- **What resources already exist, and how can we better identify and discover them?**
- **Where are the gaps in our resources, communications, and capacities?**

Geodesy and the

OBJETIVOS DE DESARROLLO SOSTENIBLE SUSTAINABLE DEVELOPMENT GOALS

- **Earth observations and derived information have already played key roles in supporting sustainable development.** Serving the *2030 Agenda*, they can play insightful roles in **monitoring targets, planning, tracking progress,** and helping nations and other stakeholders **make informed decisions,** plans, and on-going adjustments that will contribute toward achieving the SDGs.
- **Combined with demographic and statistical data,** these sources enable nations to analyze and model conditions, create maps and other visualizations, evaluate impacts across sectors and regions, monitor change over time in a consistent and standardized manner, and improve accountability.

Disaster Risk Reduction (Sendai Framework) & the SDGs



Aligning disaster-related SDGs with the Sendai Framework for Disaster Risk Reduction.

GEO is working to support the Sendai Framework and to address disaster-related goals, targets and indicators of the 2030 Agenda:

- 3 SDGs
 - 1: End poverty in all its forms everywhere
 - 11: Make cities and human settlements inclusive, safe, resilient and sustainable.
 - 13: Take urgent action to combat climate change and its impacts
- 4 SDGs Targets
- 11 SDGs indicators





11 CIUDADES Y COMUNIDADES SOSTENIBLES



Geodesy Contributions to SDG 11 Sustainable Cities and Communities

Sustainable Development Goal 11 is to make cities and human settlements inclusive, safe, resilient and sustainable

TARGET 11.5: By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by **disasters**, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations

De aquí a 2030, reducir significativamente el número de muertes causadas por los desastres, incluidos los relacionados con el agua, y de personas afectadas por ellos, y reducir considerablemente las pérdidas económicas directas provocadas por los desastres en comparación con el producto interno bruto mundial, haciendo especial hincapié en la protección de los pobres y las personas en situaciones de vulnerabilidad

- **INDICATOR 11.5.2:** Direct disaster economic loss in relation to global GDP, including disaster damage to critical infrastructure and disruption of basic services
- *Pérdidas económicas directas en relación con el PIB mundial, daños en la infraestructura esencial y número de interrupciones de los servicios básicos atribuidos a desastres.*

11 CIUDADES Y COMUNIDADES SOSTENIBLES



Geodesy Contributions to SDG 11 Sustainable Cities and Communities

Sustainable Development Goal 11 is to make cities and human settlements inclusive, safe, resilient and sustainable

TARGET 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to **air quality** and municipal and other waste management

De aquí a 2030, reducir el impacto ambiental negativo per capita de las ciudades, incluso prestando especial atención a la calidad del aire y la gestión de los desechos municipales y de otro tipo

- **INDICATOR 11.6.2:** Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)
- *Niveles medios anuales de partículas finas en suspensión (por ejemplo, PM2.5 y PM10) en las ciudades (ponderados según la población)*

OBJETIVOS DE DESARROLLO SOSTENIBLE

11 CIUDADES Y
COMUNIDADES
SOSTENIBLES



SUSTAINABLE
DEVELOPMENT
GOALS

Geodesy Contributions to SDG 11 Sustainable Cities and Communities

Sustainable Development Goal 11 is to make cities and human settlements inclusive, safe, resilient and sustainable

TARGET 11.B: By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels

De aquí a 2020, aumentar considerablemente el número de ciudades y asentamientos humanos que adoptan e implementan políticas y planes integrados para promover la inclusión, el uso eficiente de los recursos, la mitigación del cambio climático y la adaptación a él y la resiliencia ante los desastres, y desarrollar y poner en práctica, en consonancia con el Marco de Sendai para la Reducción del Riesgo de Desastres 2015-2030, la gestión integral de los riesgos de desastre a todos los niveles

- **INDICATOR 11.B.2:** Number of countries with national and local disaster risk reduction strategies
- *Proporción de gobiernos locales que adoptan y aplican estrategias locales de reducción del riesgo de desastres en consonancia con las estrategias nacionales de reducción del riesgo de desastres*



Geodesy Contributions to SDG 13 Climate Action

Sustainable Development Goal 13 is to take urgent action to combat climate change and its impacts

TARGET 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

Fortalecer la resiliencia y la capacidad de adaptación a los riesgos relacionados con el clima y los desastres naturales en todos los países

- **INDICATOR 13.1.2:** Number of countries with national and local disaster risk reduction strategies
- *Número de países que adoptan y aplican estrategias nacionales de reducción del riesgo de desastres en consonancia con el Marco de Sendái para la Reducción del Riesgo de Desastres 2015-2030*



Geodesy Contributions to SDG 13 Climate Action

Sustainable Development Goal 13 is to take urgent action to combat climate change and its impacts

TARGET 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

Mejorar la educación, la sensibilización y la capacidad humana e institucional respecto de la mitigación del cambio climático, la adaptación a él, la reducción de sus efectos y la alerta temprana

- **INDICATOR 13.3.1:** Number of countries that have integrated mitigation, adaptation, impact reduction and early warning into primary, secondary and tertiary curricula
- *Número de países que han incorporado la mitigación del cambio climático, la adaptación a él, la reducción de sus efectos y la alerta temprana en los planes de estudios de la enseñanza primaria, secundaria y terciaria*
- **INDICATOR 13.3.2:** Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions
- *Número de países que han comunicado una mayor creación de capacidad institucional, sistémica e individual para implementar actividades de adaptación, mitigación y transferencia de tecnología, y medidas de desarrollo*



Jet Propulsion Laboratory
California Institute of Technology

jpl.nasa.gov

Obrigada!

*Muchas
Gracias*

Some take-home resources

- **International GNSS Service**
 - Information, data and product access: [IGS.org](https://igs.org)
- **GGOS Paper on GNSS-Enhance Tsunami Early Warning Systems**
 - Download report: bit.ly/gtews2018
- **GGIM-World Bank Integrated Geospatial Information Framework**
bit.ly/GGIMWBigif
- **UN Global Geospatial Information Management + GGRF**
 - Committee of Experts: ggim.un.org
 - Subcommittee on Geodesy: ggim.un.org/UNGGIM-wg1/
 - Information about the GGRF: www.unggrf.org
- **Sendai Framework for Disaster Risk Reduction**
 - Global Assessment Report 2019: gar.unisdr.org
 - Interactive Story Map: arcg.is/1f9OXP
 - Sendai Framework Monitor: sendaimonitor.unisdr.org
- **Sustainable Development Goals**
 - Group on Earth Observations support of SDGs: eo4sdg.org



@allisonordnung

@igsorg

@IAG_GGOS

@UNGGRF

@UNGGIM

@UNDRR

@PreventionWeb