BADAN INFORMASI GEOSPASIAL

Geodetic Reference Frames of Indonesia

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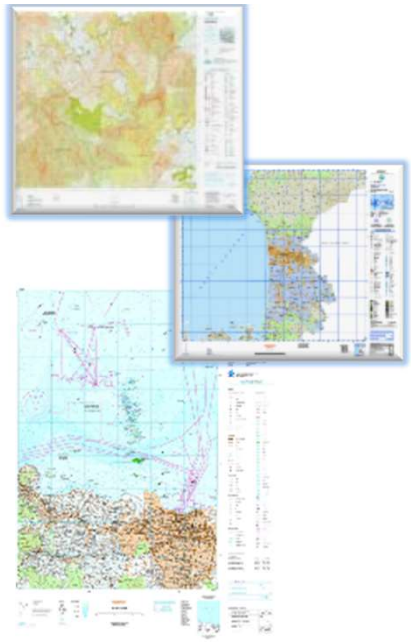
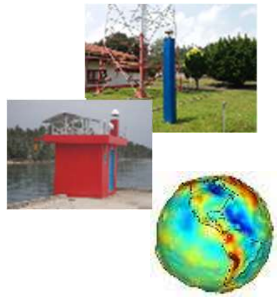
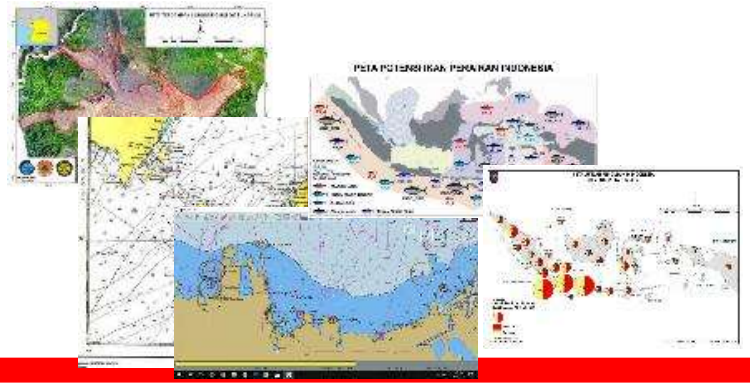
GEOSPATIAL INFORMATION
(Law No. 4/2011)

Information that shows the location, and position of an object or event that is below, on, or above the surface of the earth which is stated in a particular coordinate system.

- **Geospatial Information**
  - **Basic Geospatial Information** — BIG
    - **Basemaps**
      - Contents:
        1. *Coastline*
        2. *Hysography*
        3. *Hydrography*
        4. *Geographical Names*
        5. *Boundaries*
        6. *Transportation and Utilities*
        7. *Buildings & Public Facilities*
        8. *Land Cover*
      - **Topographic Maps**
      - **Coastal Maps**
      - **Marine Maps**
    - **Geodetic Control Network** — Geodetic Reference Frame
      - **Horizontal**
      - **Vertical**
      - **Gravity**
  - **Thematic Geospatial Information** — Other Institutions
    - **Various Thematic Maps**







Indonesian Geospatial Reference System (IGRS) 2013

HORIZONTAL DATUM

- **Launched: 11 October 2013**
- **Semi-Dynamic datum.**
- **Refer to ITRF2008 reference frame.**
- **Reference epoch: 1 January 2012**
- **Reference Ellipsoid: WGS 1984**
  (a = 6378137.0 m; 1/f = 298,257223563).
- **Currently in the process to update the IGRS 2013 to refer to ITRF2014.**
- **A velocity model, which incorporates tectonic plate movements and earthquake related deformation, is used to transform coordinates at an observation epoch to or from this reference epoch.**

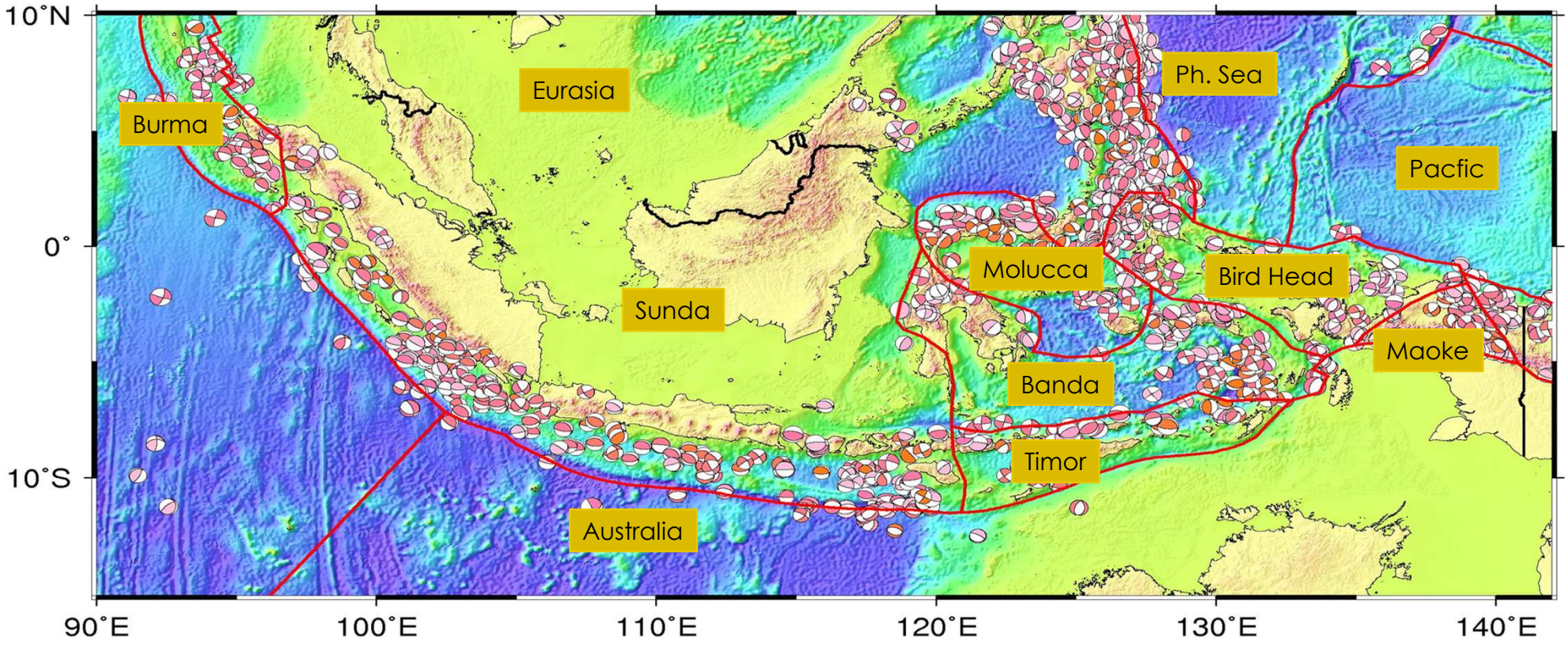
Indonesian Geospatial Reference System (IGRS) 2013

VERTICAL DATUM

- Indonesian Vertical datum is Geoid.
- The Geoid is derived from the gravity surveys which was tied to National Gravity Control Network (NGCN).
- NGCN has to be connected to the IGSN71 or its new version.
- In case there is no official Geoid yet, the vertical datum is MSL derived from 18.6 years tide observation or at least from 1 year observation.

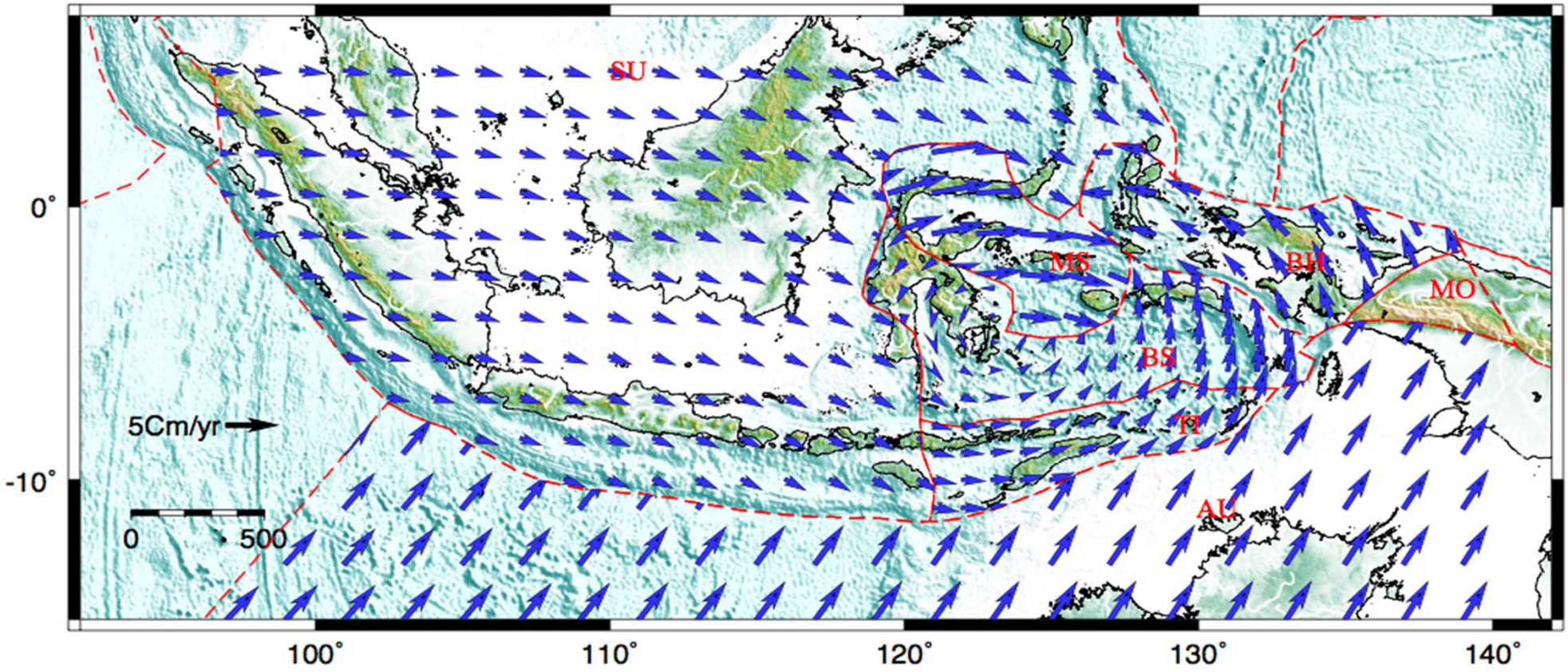
SRGI 2013 : Initial Deformation Model

Deformation model based on 4 tectonic plates, 7 tectonic blocks, and 126 earthquakes data



Susilo, BIG (2017).

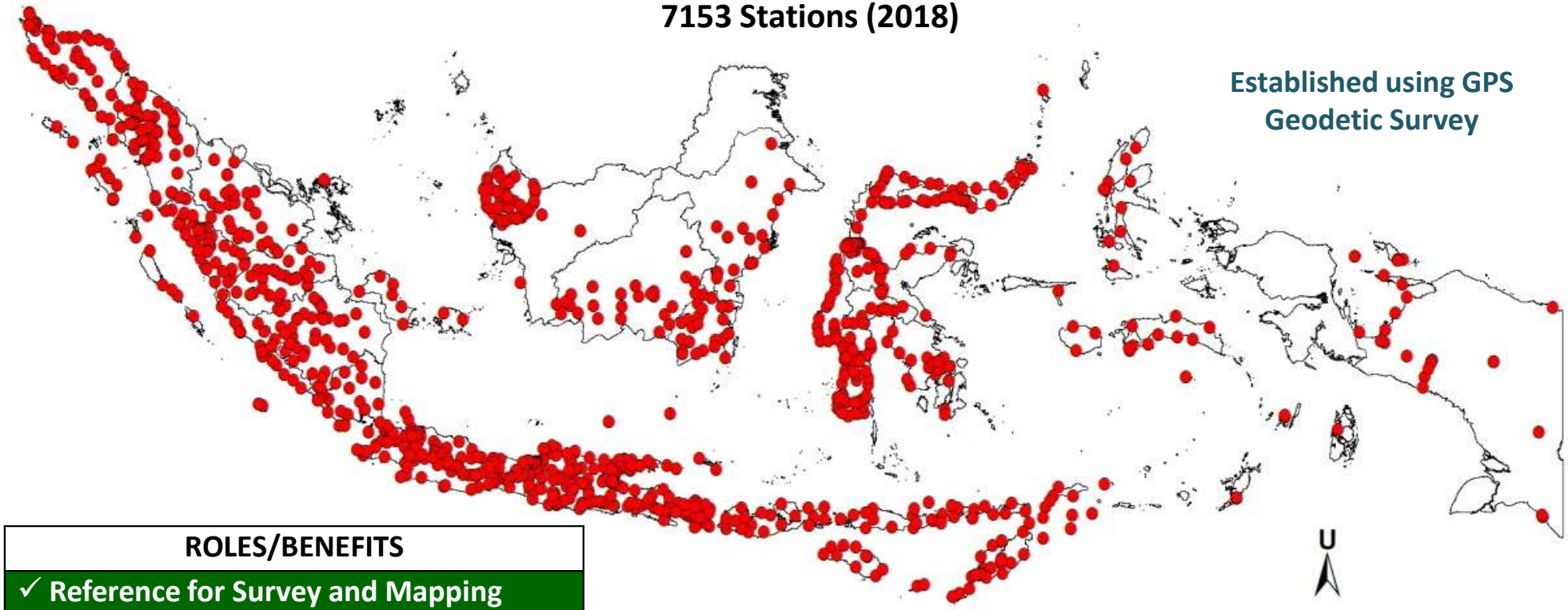
IGRS 2013 : Velocity Rates



Susilo, BIG (2017).

Static Geodetic Control Network of Indonesia

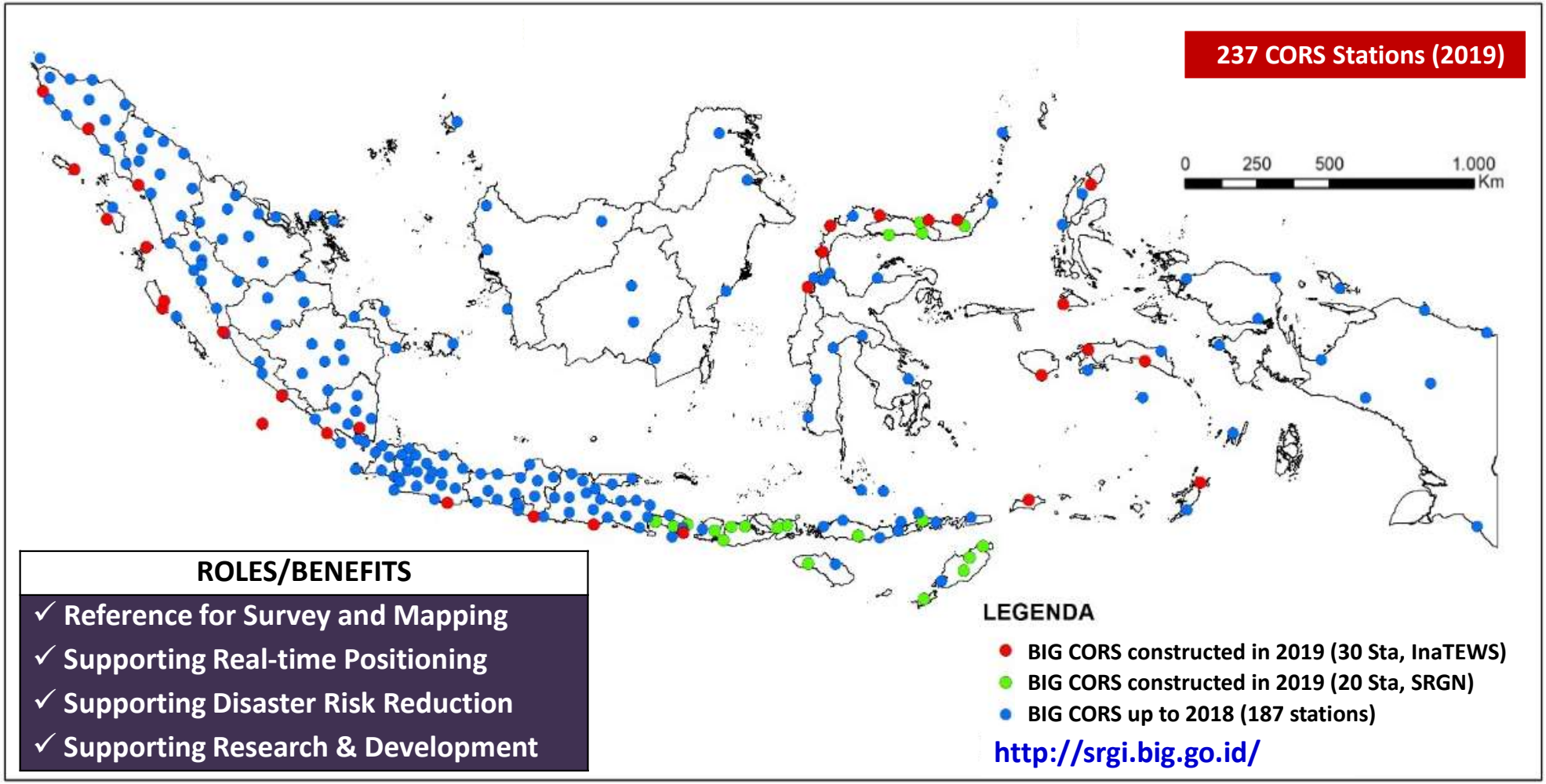
7153 Stations (2018)



ROLES/BENEFITS
✓ Reference for Survey and Mapping
✓ Supporting Disaster Risk Reduction
✓ Supporting Research & Development

http://srgi.big.go.id/

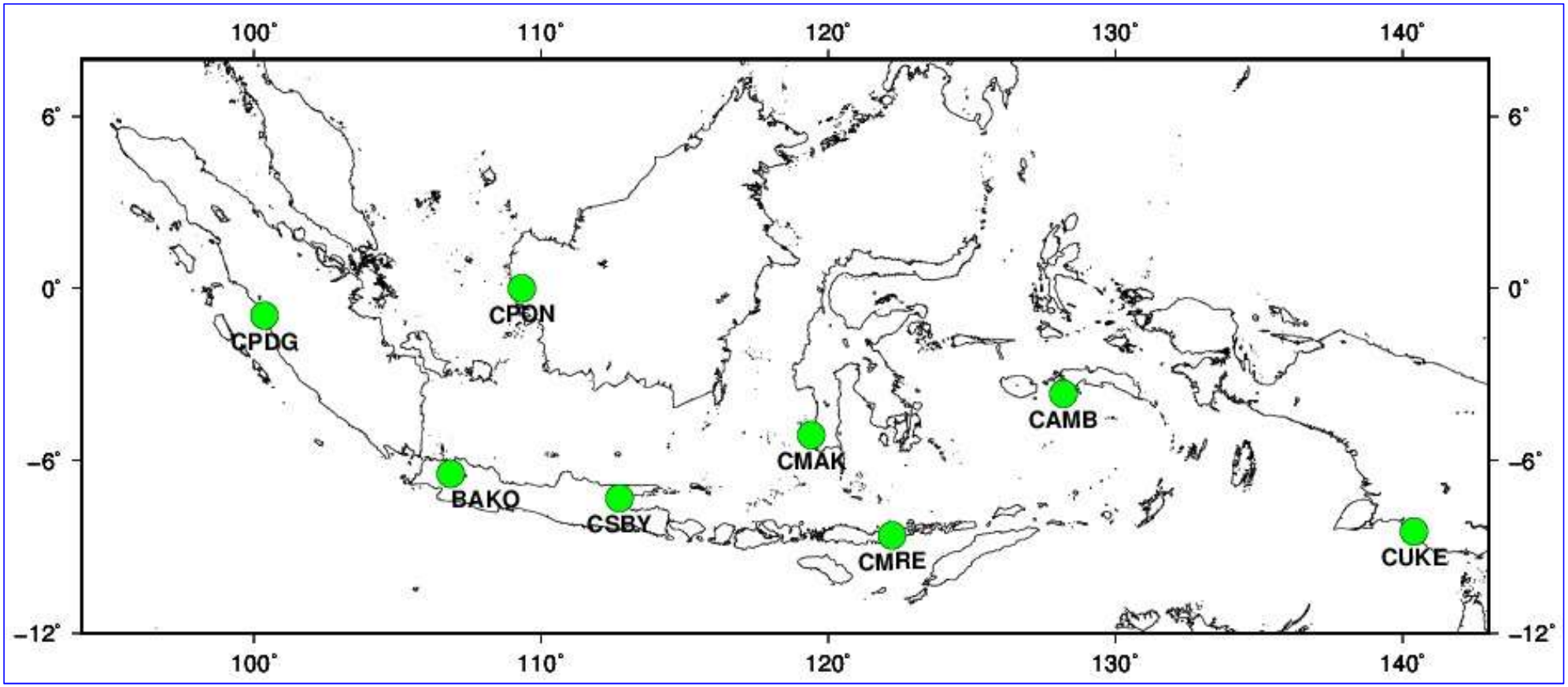
GNSS CORS Network of Indonesia



ROLES/BENEFITS

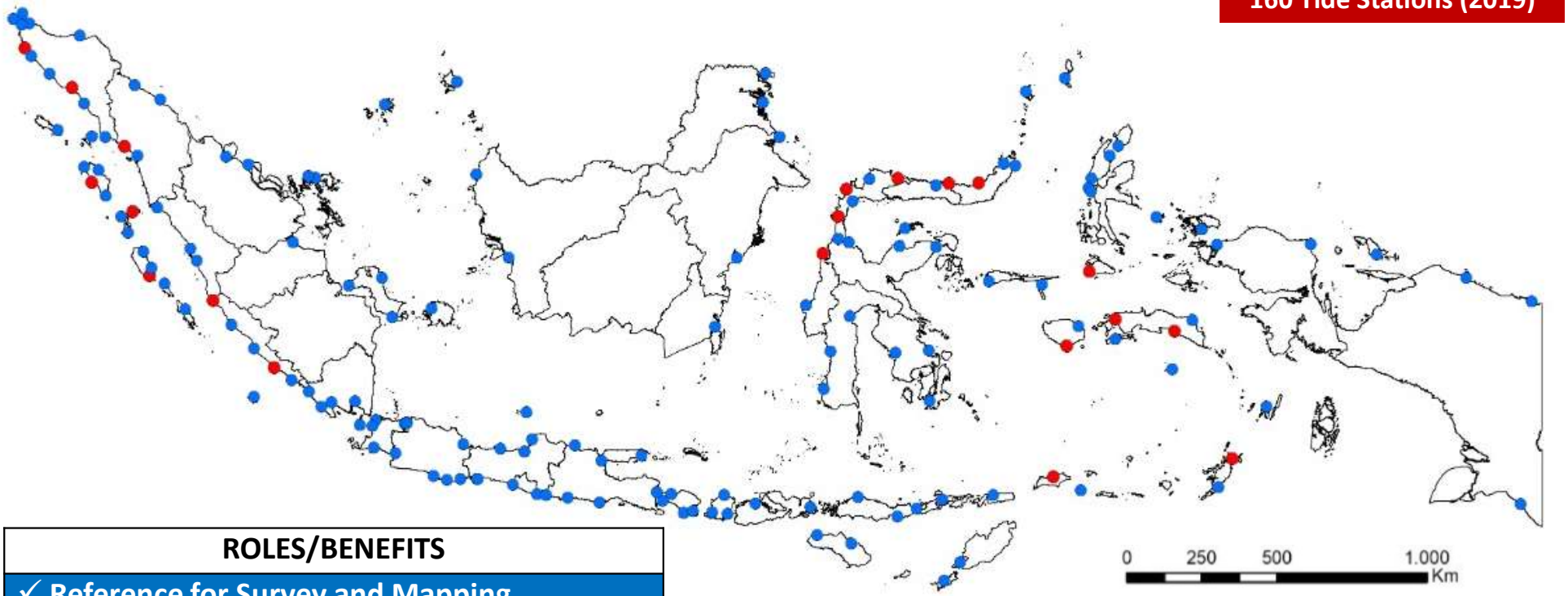
- ✓ Reference for Survey and Mapping
- ✓ Supporting Real-time Positioning
- ✓ Supporting Disaster Risk Reduction
- ✓ Supporting Research & Development

Indonesian CORS Stations Contributed to APRGP 2019



Tide Gauges Network of Indonesia

160 Tide Stations (2019)



ROLES/BENEFITS

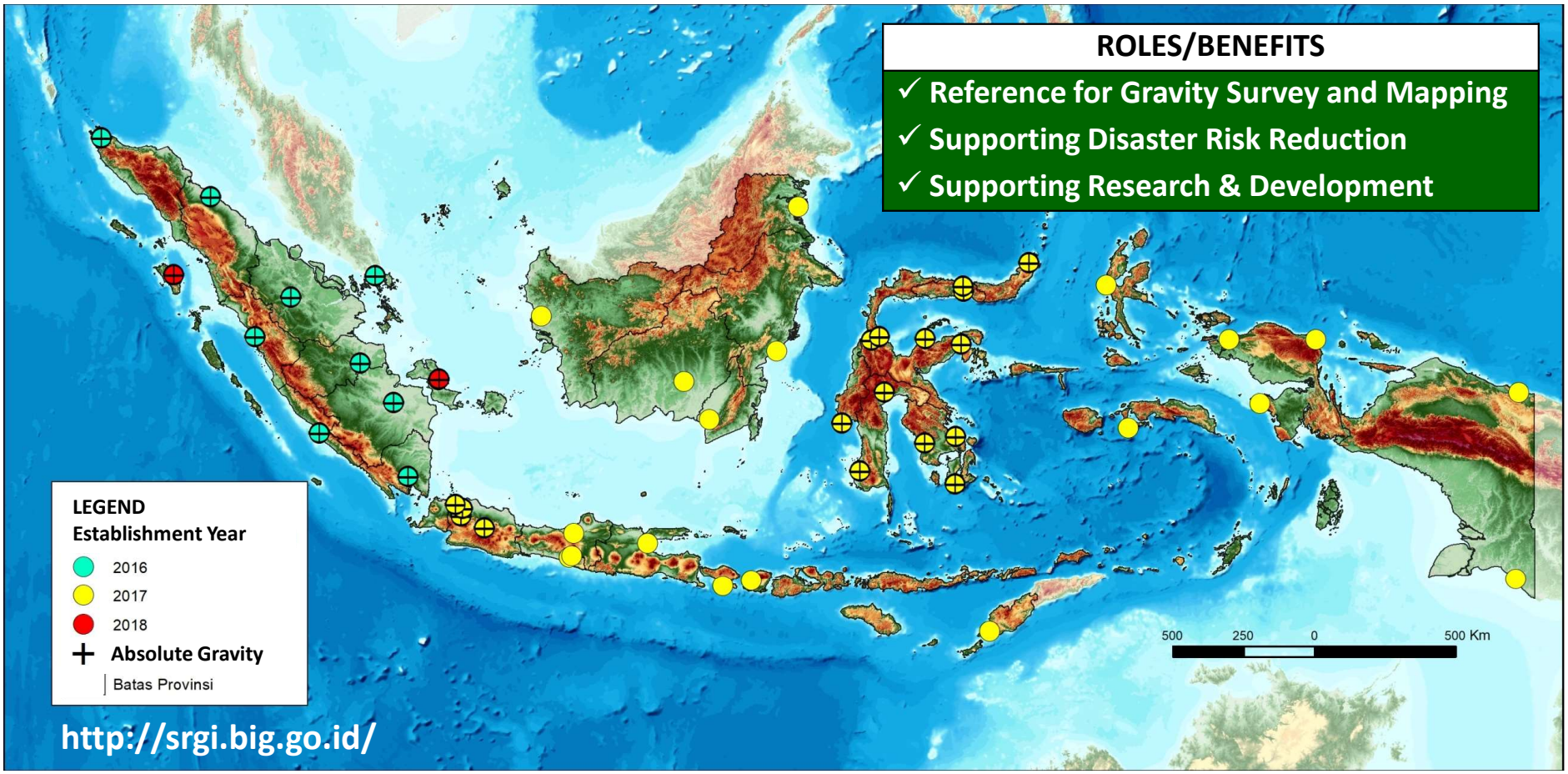
- ✓ Reference for Survey and Mapping
- ✓ Supporting Tsunami Early Warning System
- ✓ Supporting Maritime Navigation
- ✓ Supporting Research & Development

LEGEND:

- BIG Tide Gauges constructed in 2019
- BIG Tide Gauges up to 2018 (139 stations)

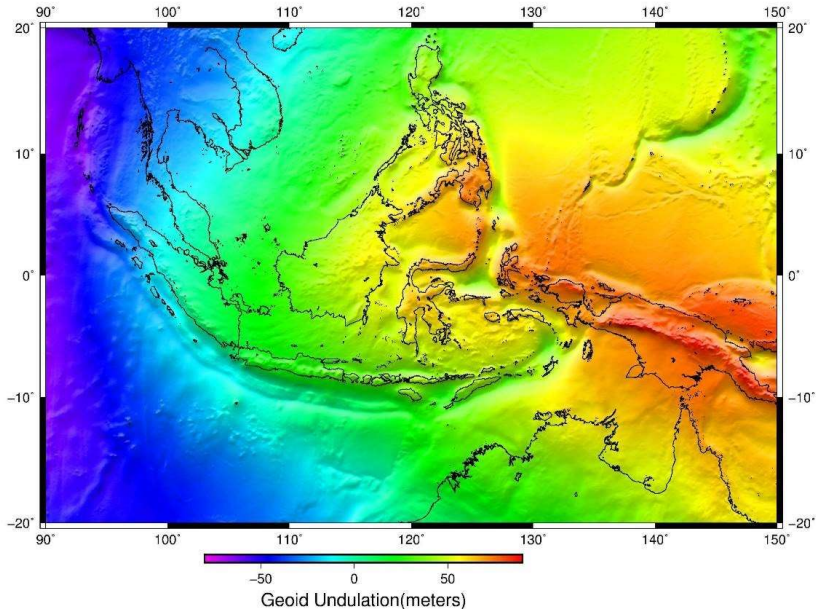
http://tides.big.go.id/

Main Gravity Control Network of Indonesia



Total Gravity Control Network by 2018: 50 stations (Absolute Gravity)

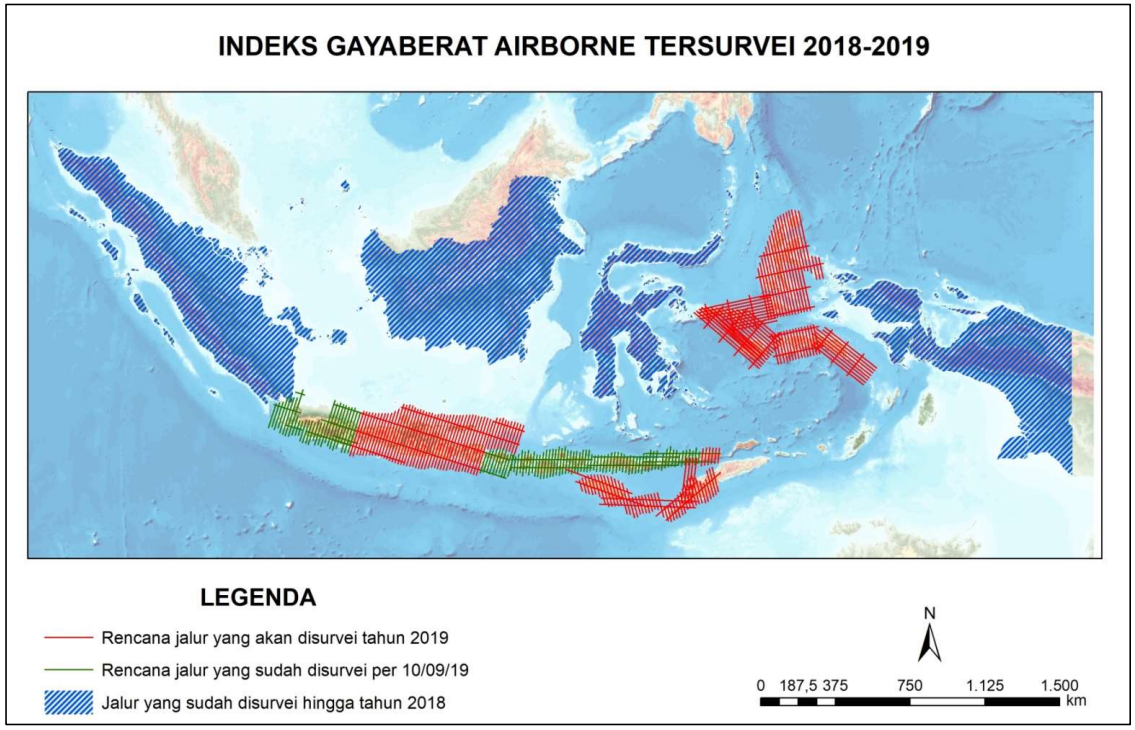
Geoid of Indonesia



ROLES/BENEFITS

- ✓ Reference for Survey and Mapping
- ✓ Supporting Disaster Risk Reduction
- ✓ Supporting Research & Development

Based on the 2018 geoid processing results, the Indonesian geoid model was obtained with an accuracy of around 15-20 cm. Airborne gravity data used to produce this geoid model are only from the islands of Kalimantan, Sulawesi, Papua and Sumatra.



In order to improve the accuracy of the Indonesian geoid model, in 2019 the airborne gravity surveys were carried out on the islands of Java, Bali, Nusa Tenggara, and Maluku, with validation using data from the results of leveling and GPS surveys on Java and Bali islands.

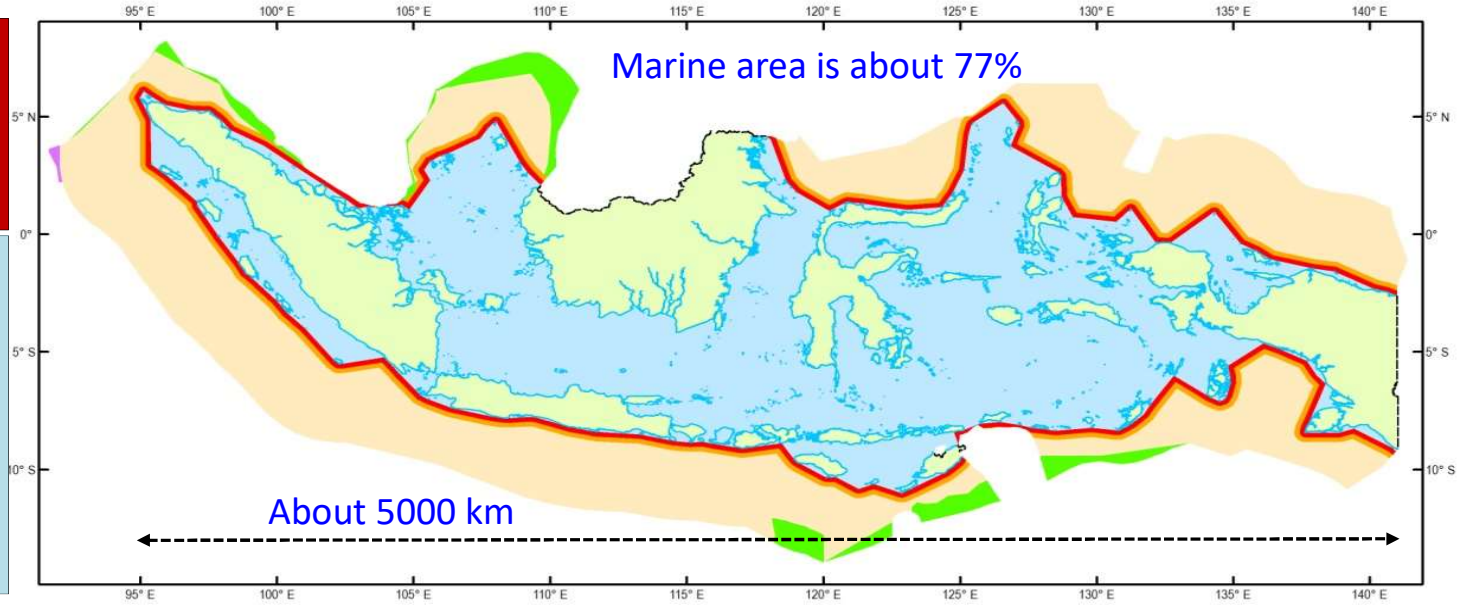
http://srgi.big.go.id/

Closing Remarks

Maritime Continent of Indonesia

INDONESIA
has vast territory and abundant land and marine resources

Geospatial Information is compulsory for supporting sustainable development of Indonesia and managing its natural resources

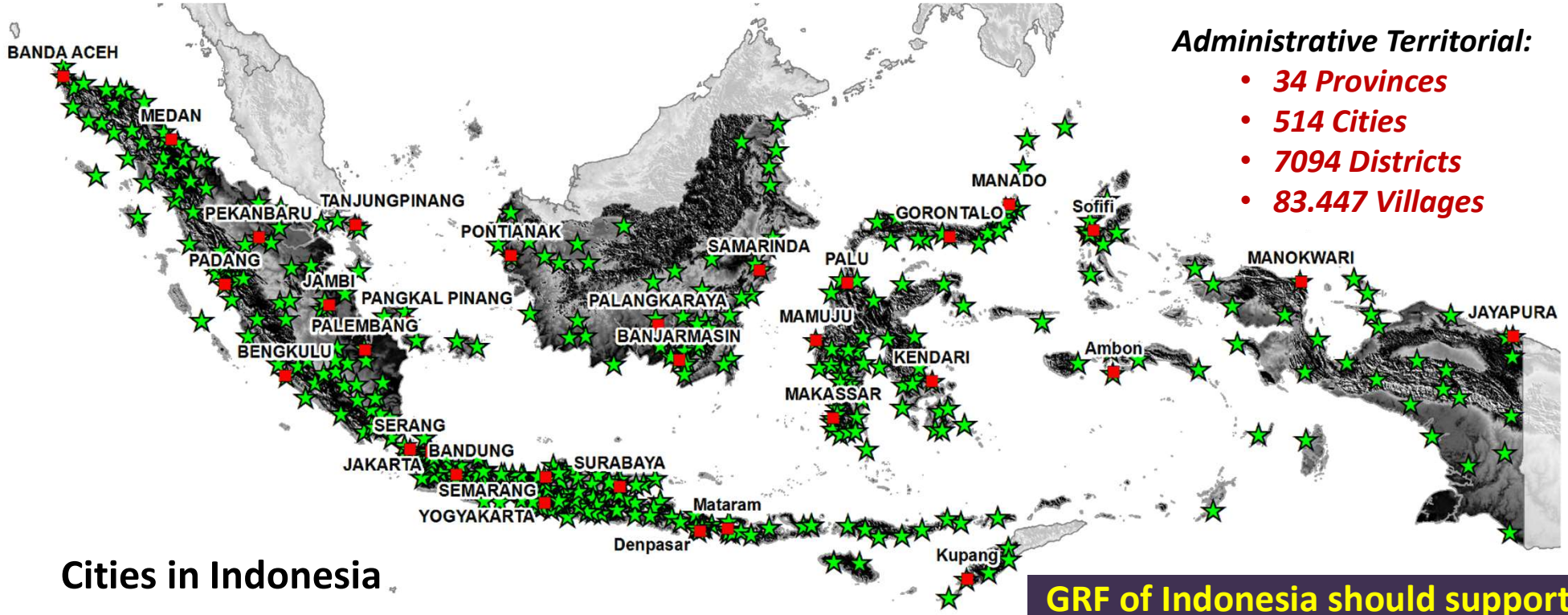


LAND AREA	1.900.000 Km^2
MARITIME AREA : Sovereignty Territory	
• Internal and archipelagic waters	3.110.000 Km^2
• Territorial Sea	290.000 Km^2
MARITIME AREA : Sovereign Right Zone	
• Contiguous Zone	270.000 Km^2
• Economic Exclusive Zone	3.000.000 Km^2
• Continental Shelf	2.800.000 Km^2
MARITIME AREA OF INDONESIA	6.400.000 Km^2
TOTAL AREA OF INDONEA (LAND & WATER)	8.300.000 Km^2

Coastline length	108.000 Km
Number of Islands	17.504 islands, 16.671 islands has been verified and submitted to UN (2018)

GRF of Indonesia should cover the whole region of Indonesia, for supporting various positioning, surveying, and mapping activities at various scales.

Geospatial-Enabling Smart Cities Program in Indonesia



Administrative Territorial:

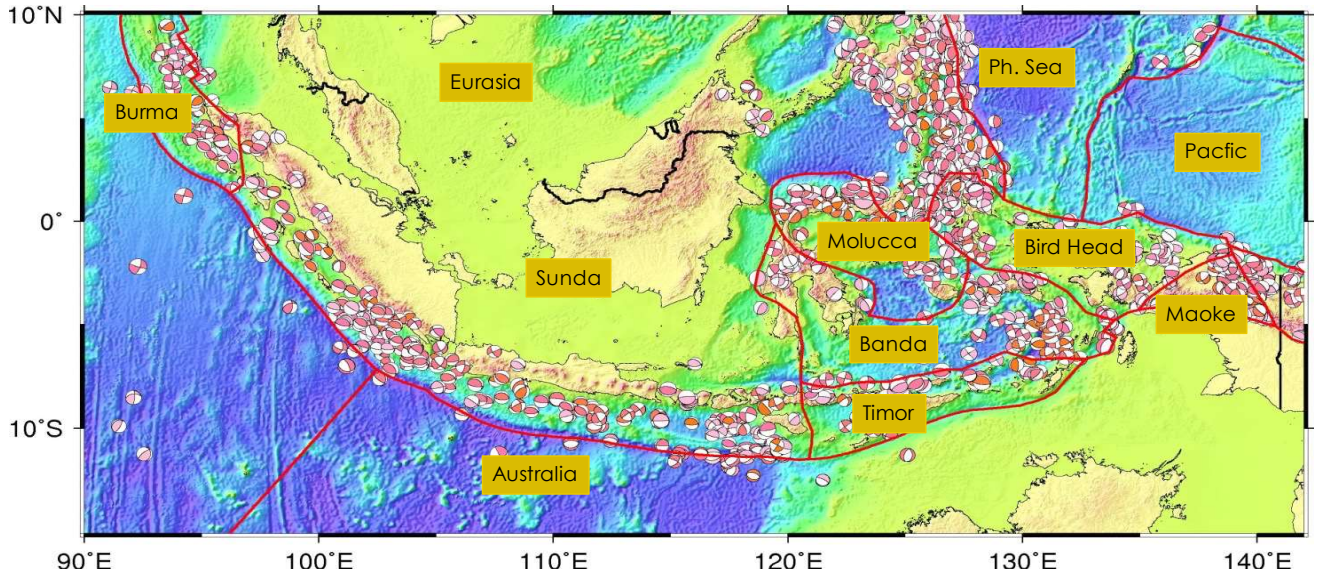
- ***34 Provinces***
- ***514 Cities***
- ***7094 Districts***
- ***83.447 Villages***

Cities in Indonesia

- Cities
- Provincial Capital

Geospatial Information is necessary for realization of **Smart Cities** program and activities

GRF of Indonesia should support various positioning, surveying, and mapping activities **for enablement of smart cities in all region of Indonesia**

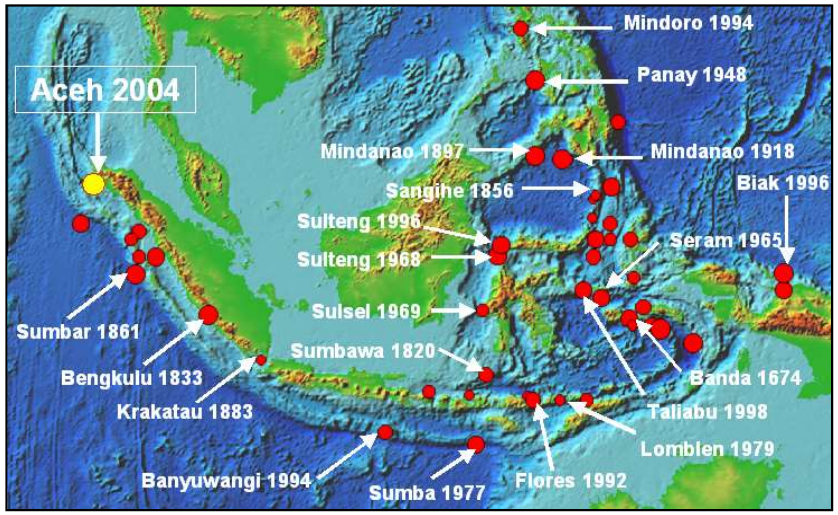


INDONESIA

Home of Natural Hazards

Geospatial Information (including GRF) should support Disaster Risk Reduction Management activities

- *Earthquakes*
- *Tsunami*
- *Volcano Eruption*
- *Flooding*
- *Landslide*
- *Land subsidence*
- *Drought*
- *Flooding*
- *Forest fire*
- *Windstorm*



Thank you very much