



Philippine Active Geodetic Network



PageNET: In Support of the Surveying Community

ICG Experts Meeting: Global Navigation Satellite Systems Services

Vienna International Center, Vienna, Austria

December 14-18, 2015

Presentation Outline

- ❑ Introduction
- ❑ Establishment of Stations
- ❑ Current Users and Applications
- ❑ Modernization of the National Geodetic System



Where in the world are we...

Introduction

- ❑ NAMRIA is mandated to establish and maintain the national geodetic network, the reference for all surveys and maps in the Philippines
- ❑ In 2008, the Agency established the Philippine Active Geodetic Network (PageNET), the country's CORS network
- ❑ These network of permanently-installed, continuously operating geodetic stations provide real time, high precision geographic position data via the internet. It is designed to support a broad spectrum of post-processed and real time GNSS positioning techniques and applications



Establishment of stations

- ❑ To date: Thirty three (33) stations have been established
- ❑ Each AGS is equipped with a geodetic grade GNSS receiver and antenna, supplementary sensors (meteorological and tilt on selected stations), router, solar power system, lightning arrestor and Ethernet port surge protector.



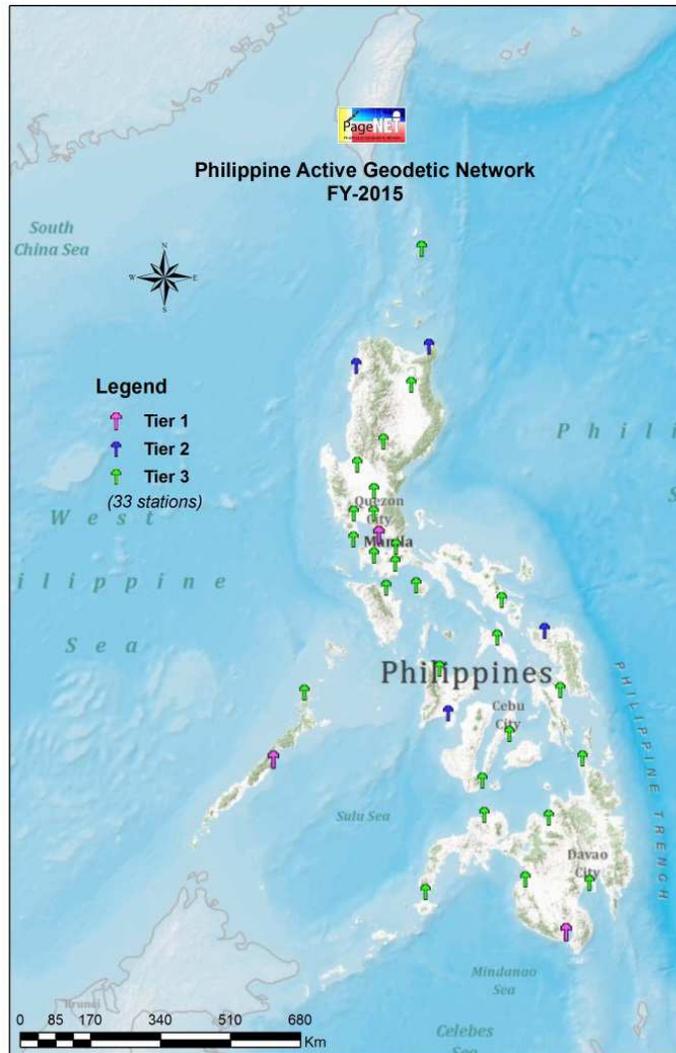
Establishment of stations

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Establishment of stations



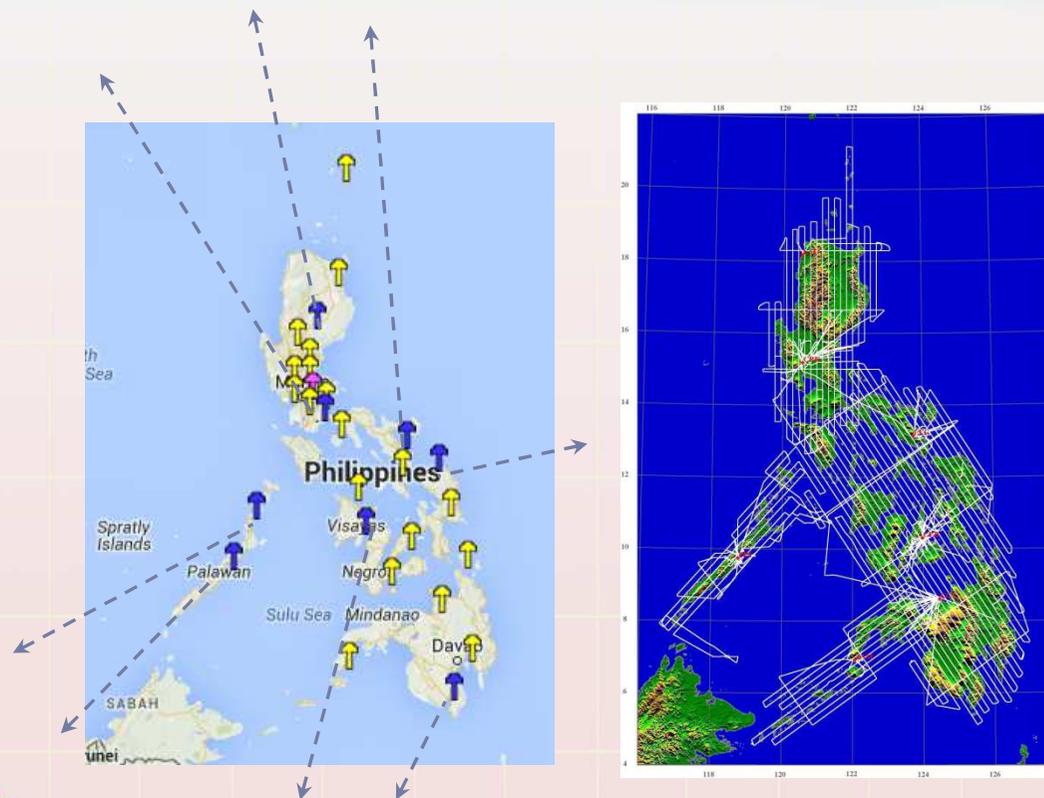
Current Users and Applications

PageNET

Surveying - NAMRIA

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- Connection to ITRF for Datum definition
- Airborne Gravity Survey for Geoid Computation



Current Users and Applications

PageNET

Surveying - NAMRIA

NAMRIA

- Re-Obsevation of Zero Order Geodetic Controls



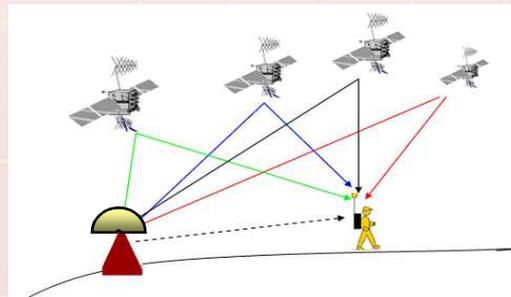
Current Users and Applications

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Surveying - Survey Practitioners

- Post-processed static survey for geodetic controls
- RTK for engineering surveys



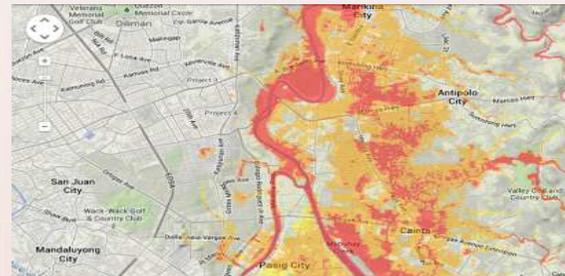
Current Users and Applications

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Mapping – Manila Water and University Research

- Water Utilities mapping
- Hazard mapping/ Flood Modeling



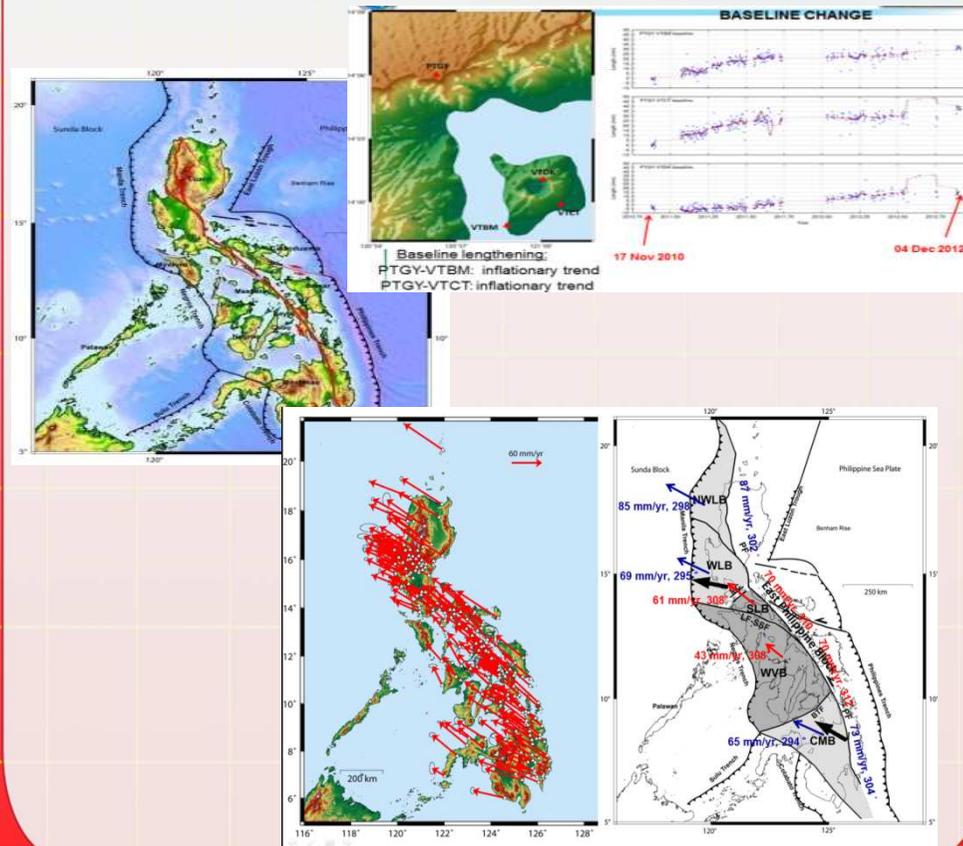
Current Users and Applications

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Scientific Studies – Philippine Institute of Volcanology

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- Crustal movement
- Volcano monitoring for disaster mitigation
- Earthquake studies



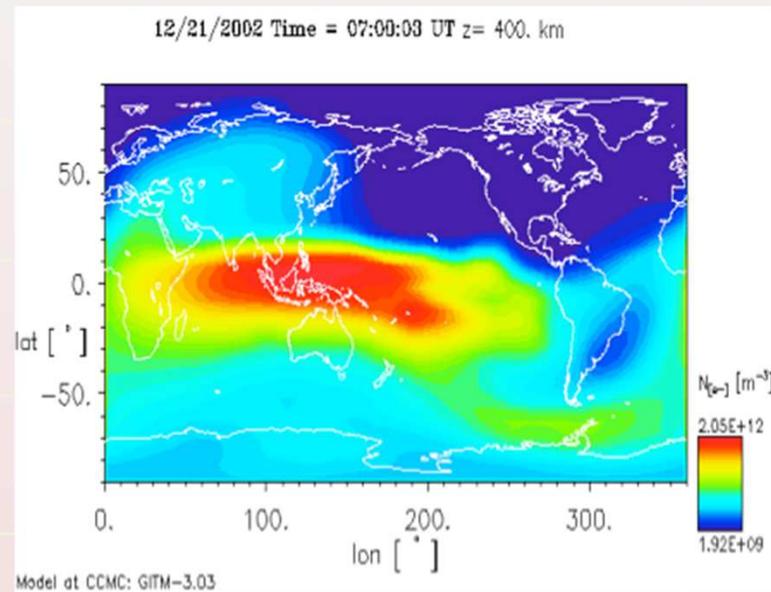
Current Users and Applications

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Scientific Studies – International Civil Aviation Organization (ICAO) thru Civil Aviation Authority of the Philippines (CAAP)

- Ionosphere studies for Aviation



Current Users and Applications

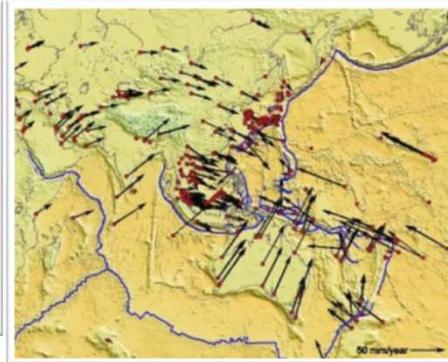
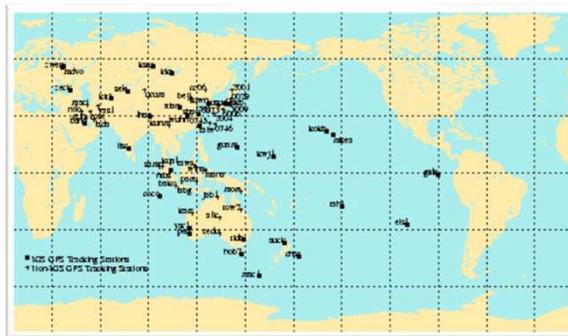
❑ International Cooperation

❑ Asia and the Pacific Regional Geodesy Project (APRGP)

NAMRIA has always been participating in the APRGP Campaigns since 2000, then from 2008 through the PageNET stations.

❑ Asia-Pacific Reference Frame (APREF) Project

NAMRIA has joined in the APREF Project in October 2010 through PTAG



- Establish station coordinates and velocities in an international reference frame
- Establish problems caused by tectonic movements
- Establish a regional horizontal and vertical datum and develop transformation parameters between each local system and the regional datum

Aims to create and maintain an accurate and densely realized geodetic framework, based on continuous observation and analysis of GNSS data

Current Users and Applications

☐ International Cooperation

☐ International GNSS Service (IGS)

*PageNET station PTAG has been included in the IGS tracking network on April 2010;
December 2015 – inclusion of PPPC and PGEN*

☐ Multi-GNSS Monitoring Network (MGM-Net) Project

NAMRIA is host to PLUZ and PMIN for the Japan Aerospace Exploration Agency (JAXA)

☐ Memorandum of Understanding with Geoscience Australia (GA)

NAMRIA entered into a MOU with GA for sharing of PageNET data to improve the geodetic infrastructure in the Asia-Pacific region.

☐ Reseau pour l'IGS et la Navigation (REGINA) Project

NAMRIA is host to PTGG which is collocated with PTAG and the DORIS beacon Manille through a MOA with CNES and IGN

Modernization of the National Geodetic System

- ❑ NAMRIA has included the modernization of the national geodetic system as part of its strategic plan towards building a geospatially empowered Philippines by 2020
- ❑ The modernization is aligned with the UN General Assembly Resolution No. 69/266 on a Global Geodetic Reference Frame for Sustainable Development
- ❑ The PageNET plays a major role in the alignment of the Philippine Geodetic Network to ITRF/GGRF



Modernization of the National Geodetic System

Densification of PageNET

200 AGS from 2016 to 2020

Migration to a semi-dynamic geocentric datum (Philippine Geocentric Datum 2020 (PGD2020))

- Connect PageNET stations to ITRF
- Re-Observe Zero, 1st & 2nd Orders

Development and maintenance of a MSL-based geoid datum (Philippine Geodetic Vertical Datum 2020, PGVD2020)

- Densify Gravity Stations to 41,000
- Re-compute the Philippine Geoid

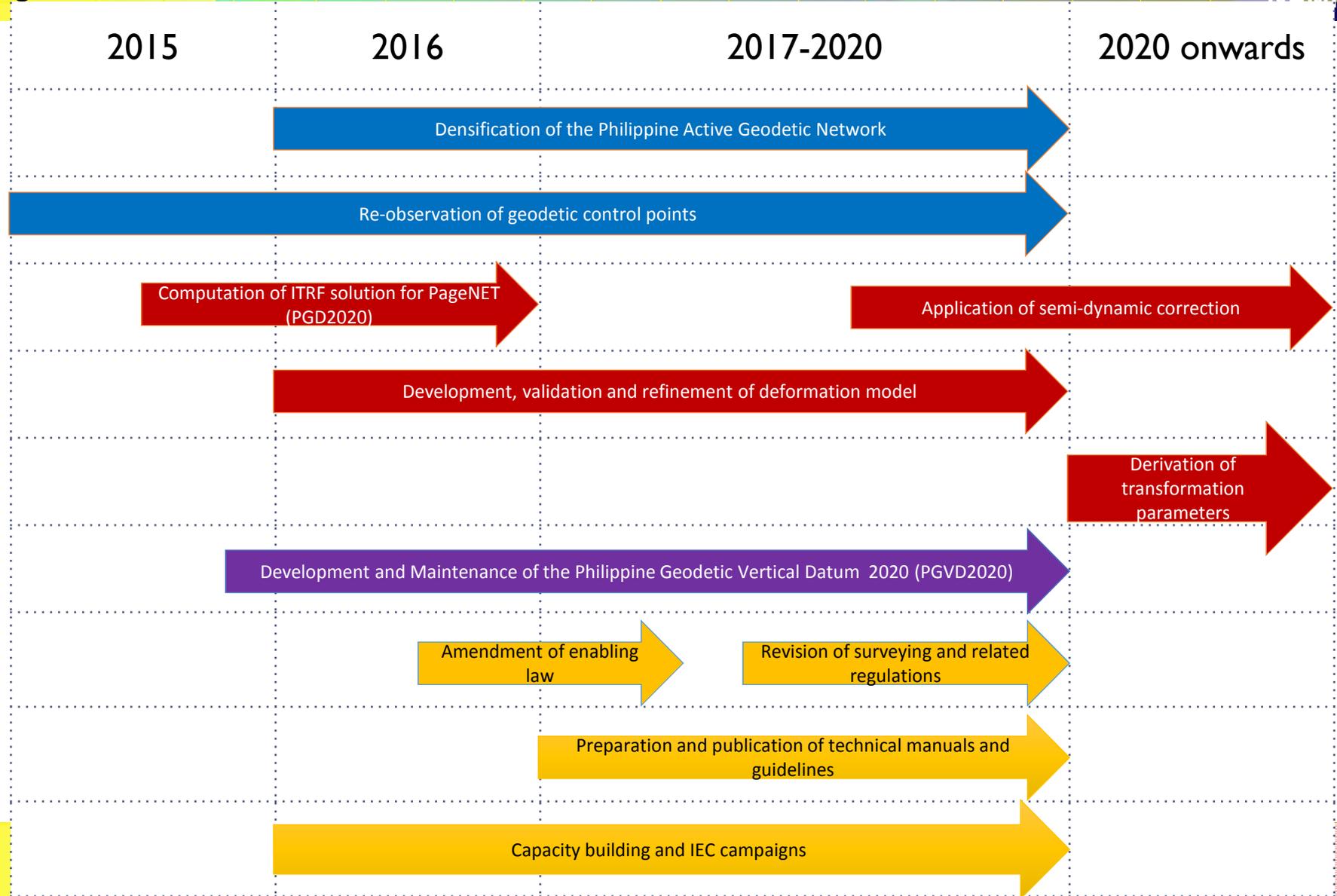
Strengthening of core competencies on geodesy

Capacitate NAMRIA on Geodesy thru seminars & training

Modernization of the National Geodetic System TIMELINE

PageNET

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Modernization of the National Geodetic System

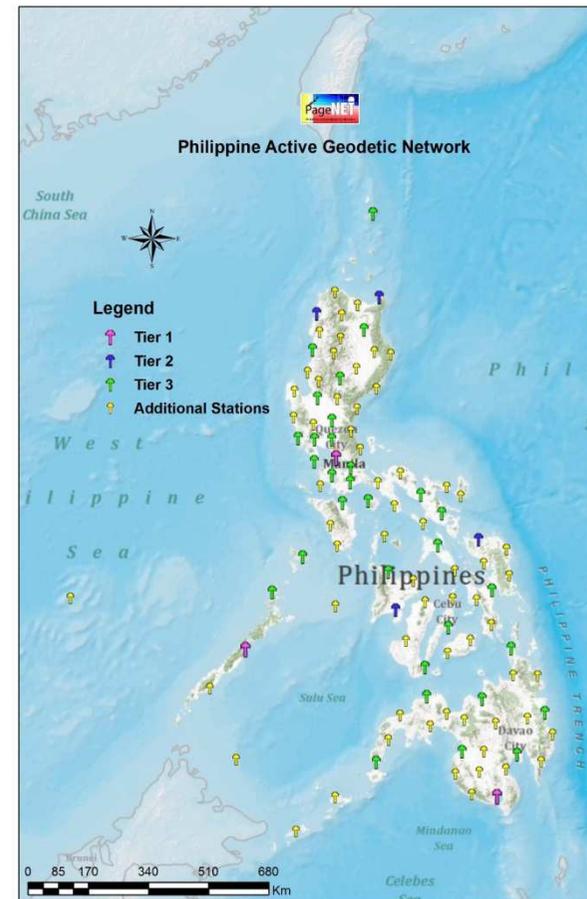
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Densification of the PageNET

- The plan is to put up 200 Active Stations nationwide and connect to ITRF

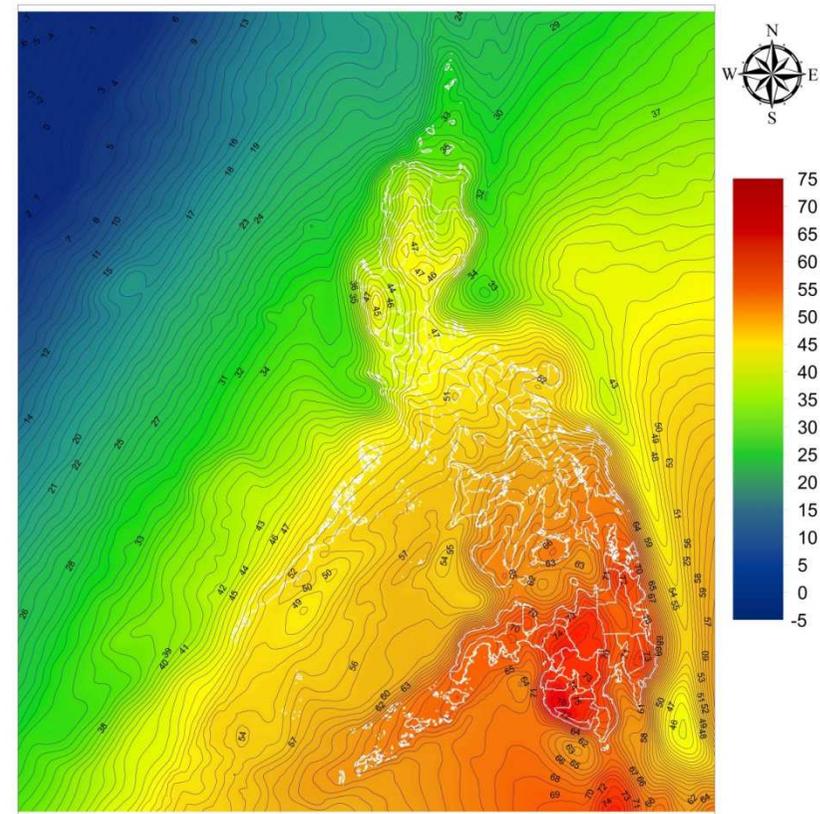
Re-Observe 65 - Zero, 3000 - 1st and 2nd Order GCPs and connect to PageNET



Modernization of the National Geodetic System

Development of the Philippine Geodetic Vertical Datum 2020 (PGVD2020)

- Densify the Land Gravity stations by 41,000 nationwide and re-compute the Philippine Geoid
- Fit the geoid to the Leveling for a MSL-based geoid



PHILIPPINE GEOID MAP 2014
NATIONAL MAPPING AND RESOURCE INFORMATION AUTHORITY
Mapping and Geodesy Branch
Geodesy Division
SCALE 1:2,300,000

0 125 250 500 750 1,000 Kilometers

THANK YOU
Salamat Sa Inyo