Challenges and Innovations in Tsunami Early Warning Systems:

Indonesia tsunami early warning system (InaTEWS) and Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS) (IOTWMS)

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Roundtable: Maritime Sector Strategies to Augment Tsunami Monitoring with Economic, Safety and Environmental Co-benefits

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• **Challenges:**
  – Planet Earth System with the exponential dynamic and complexity & results in sharply increments of numbers, frequency and intensity of catastrophic events.
  – Diversity of Indonesia (geographical, geological & geophysical as well as socio-cultural) require more specific and rigorous efforts

• **How to survive, resilient and sustain**
  – Target 2020-2024 :
    • Super High Speed of computation (EEWS 15 seconds, TEWS < 2 mins, Weather (resolution < 3 km², accuracy 90% - 100%, 2 weeks in adv), Climate accuracy 85%)
    • User friendly, Useable and Used System of Early Warning and DRR.
  – Intelligent data and system:
    • Data requirements & integration
    • Scaling-up IT System
    • Smart EWS (MHEWS)
  – Transformation from 4.0 to 5.0
CHALLENGES
Ring of fire

Active Plate Tectonic

Population: 267 Millions
Island: 17.504

Source: Pusgen (2017) and IABI (2013)
IMPACTS

Indonesia

Disaster related Weather and Climate: 96 %
How to Survive & Resilient

TARGET 2020-2024
TARGET 2020-2024 (InaTEWS)

Present

Future

5 yrs

Super High Speed of computation
EEWS 15 seconds, TEWS < 2 mins
User friendly, Useable and Used System of Early Warning and DRR

PRESENT
-Eq Info & Tsunami Early Warning: 5 mins

EQ Early Warning System
TARGET 2020-2024
(MEWS, CEWS)

**Present**

**MEWS**

- Accuration 80%
- EarlyWarning 3 hrs before

**CEWS**

- Super High Speed computation
- Climate accuracy 76%

**Future**

Super High Speed of computation
resolution < 3 km², accuracy 90% - 100%,
Warning 2 weeks in adv
User friendly, Useable and Used System of
Early Warning and DRR
How to Survive, Resilient & Sustain

INTELLIGENCE DATA AND SYSTEM
Intelligent data and system:
- Data requirements & integration
- Scalling-up IT System
- Smart EWS (MHEWS)

a. Observation Technology
b. Processing Technology
c. Dissemination Technology
Intelligence Data and System

SMART EARLY WARNING SYSTEM (MHEWS)
BMKG made The Hub / integration of the existing EWS (InaTews + MEWS + CEWS)

Since 2008
END TO END SYSTEM FOR TSUNAMI EARLY WARNING

TSUNAMI EARLY WARNING CHAIN
From Upstream to Downstream

Artificial Intelligence (AI)
In Super Computer

Modeling Potential Tsunami Prediction
(Mathematical Modeling)

EARTHQUAKE INFORMATION & POTENTIAL TSUNAMI INFORMATION

Interface Institution

Reconfirmation / Verification Modeling

SOCIETY
TRANSFORMING MULTI-HAZARD MONITORING AND EWS TO DIGITAL AND VISUAL SINCE 2015

@infoBMKG
Followers
4.07 M

@infoBMKG
Followers
1.6 M

@infoBMKG
Followers
930 K

Largest in national social media

Media interactive
AUGMENTATION TEWS

1. InaTEWS – established since 2005 and started officially operation by 2008 – has proven to work well by issuing 22 (twenty two) tsunami potential information where 7 (seven) was no-tsunami follow up. By 2012, InaTEWS has been appointed as Tsunami Service Provider for Indian Ocean together with Australia dan India, tested twice a year through COMMTEST regionally, and every month nationally;

2. EQT cannot be predicted. Based on Angove (2019), no-one-fits-all of observation system to improve the level of certainty on tsunami prediction.

3. Developing an augmentation mechanism to improve faster and more accurate monitoring system cannot be done on stand alone basis. Integration with the existing system is thus very important to maintain monitoring mechanism within 24/7 operation.
Thank you

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