SYSTEM IMPLEMENTATION OF COASTAL INUNDATION FORECASTING DEMONSTRATION PROJECT-INDONESIA (CIFDP-I)

A.E Sakya, Nurhayati, N.F Riama, A. Ramdani

The Agency for Meteorology Climatology and Geophysics, Indonesia

(BMKG)

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Issues and Need for Improved Coastal Flood Forecasting & Warnings

* Indonesia as archipelagic countries is very prone to coastal hazard
* Shallow coastal flooding by **extreme wave events** and **tropical cyclones**
* Persisting threat of **Tsunami**
* Increased risk of coastal inundation due to **sea level rise + land subsidence.**

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Big swell damage Western coast of Sumatera, Padang (18 May 2007)

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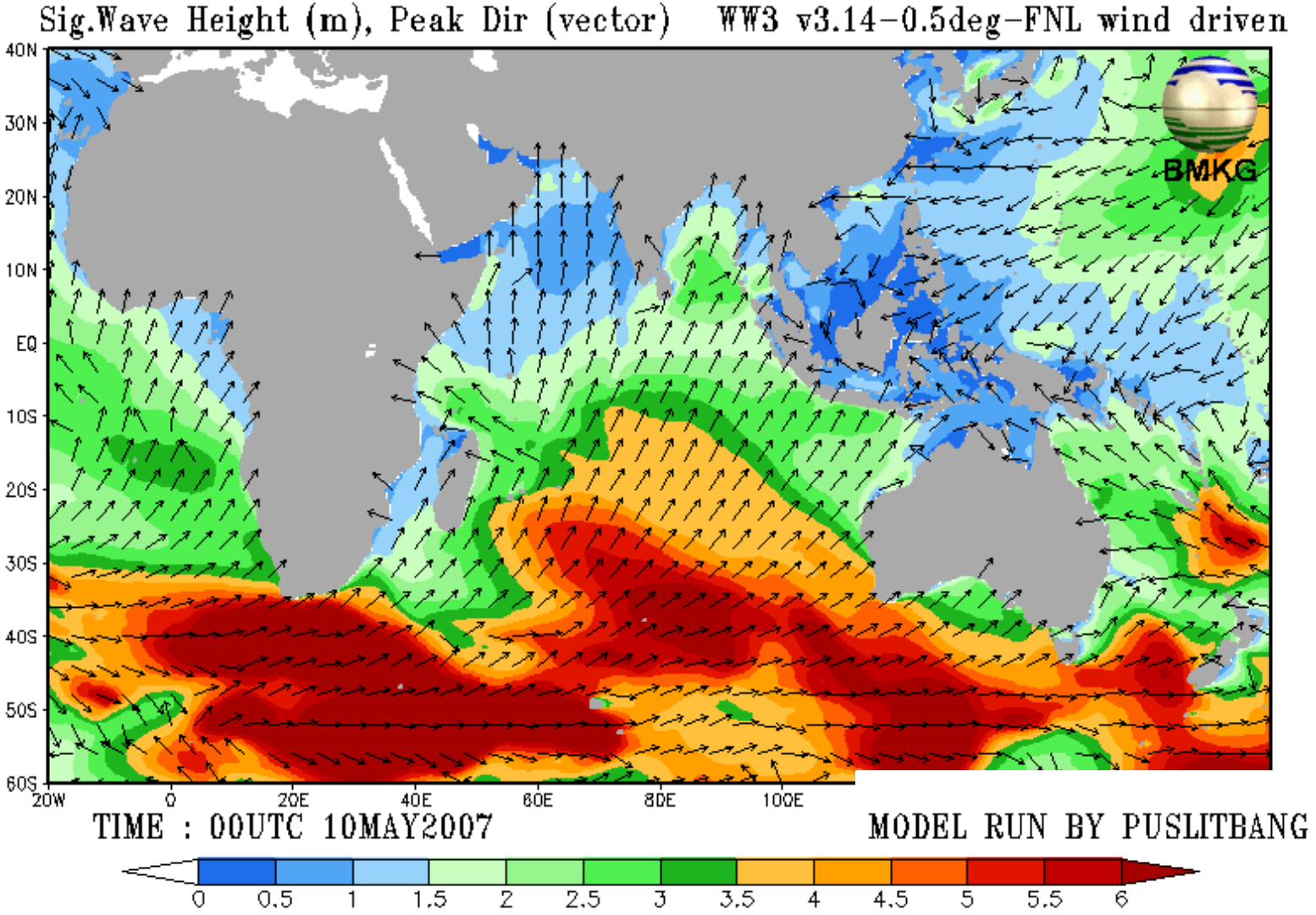
Simulation on17-19 Mei 2007,
Big swell damage Western coast of Sumatera and Southern coast of Java generated by
Tropical Cyclone in Cape of Hope (Southern of Africa)



CIFDP-Indonesia

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"To provide the **highest quality forecasting and warnings on coastal inundation** to the coastal communities of Indonesia"

- to be operated by a responsible national agency (BMKG)
- Based on clearly identified user requirements
- astronomical tides, waves, riverine flooding, rainfall and sea surface elevation anomalies in various temporal/spatial scales;
- The national partnership

Timeline

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Phase 0: Project preparation

Phase 1: Information gathering – Project Adaptation

Phase 2: System Implementation

Phase 3: Pre-operational testing

Phase 4 : Live Running & **Evaluation**

2013

3-5 Dec.2013 **National Stakeholders Workshop**

2014

October 2014 **Phase 1 Review** **Phase 2 Kickoff**

2015

2016

2015 / 2016 **Simulated Multi-agency exercises** Technical capacity building

2017

2017 **Evaluation Workshop** with Media partners & users

CIFDP-Indonesia

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* **CIFDP-Indonesia will be conducted in Jakarta and Semarang**

* **Identification causes of coastal inundation in Jakarta and Semarang.**
  - ✓ **The major causes : High tide + high waves (wind sea)**
  - ✓ **Swell from South China Sea**
  - ✓ **Riverine Flooding associated with heavy rainfall**
  - ✓ **The land subsidence also an aspect that must be considered**

* **The specific CIFDP-I forecasting systems is resolved two aspect :**
  - ✓ **The increase of Sea level height due to high tide and high waves;**
  - ✓ **The increase of River level height due to heavy rainfall.**

Issues and Need for Improved Coastal Flood Forecasting & Warnings

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SEMARANG

Scope of CIFDP-I

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* In order to design the CIFDP-I System, it must considered the technical elements, these includes:
  - Observation Data
  - Tidal Prediction
  - Wind Forcing,
  - Wave Model
  - Hydrodynamic model,
  -River Model
  - Inundation Model
  -Bathymetry & DEM
  - Field Survey Data
  - Infrastructure : computing capacity
  - Technical assitance and Training

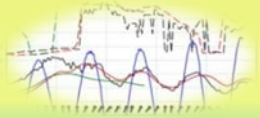
System Design for CIFDP-Indonesia

GFS/ECMWF (Global), WRF (Mesoscale: 3km/5days), Probabilistic Forecasting

Wind field & wind stresses

Ocean force observation
(Wave, Sea Surface Height Anomaly, Tide anomaly, etc.)

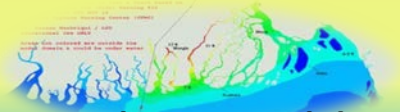
Boundary conditions



Wave Model

Atmospheric forcing
(Rainfall, temperature, etc.)

(Global) Tide model / SSHA

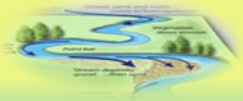


Inundation Models + Hydrodynamic Model

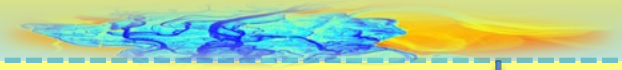
Surface water observation
(River flow, Storage, Water level, etc.)

Boundary conditions

J-FEWS



River Flood Model



Inundation Simulation

Customized products for Interpretive Forecasting/Warning

Users

Input to Decision Making Support

JAKARTA FEWS (Flood Early Warning Systems)

SCHEME OF DATA SYNCHRONOUS ON FEWS/DEWS BMKG AND PUSAIR

ACCESS-A

ECMWF

AWS

RADAR BPPT

TRMM

TELEMETRY

BMKG

PRECIPITATION
POTENTIAL
EVAPORATION
POAMA 2.5 DEGREE

SPI PEMALI COMAL
CGIAR-PET
SCHMIDIT-FERGUSON
FORECAST CCAM

Ministry of Public Affairs

Client-A Client-B Client-N

Client-A Client-B Client-N

Current Capability – River Flood Model ; Inundation Model

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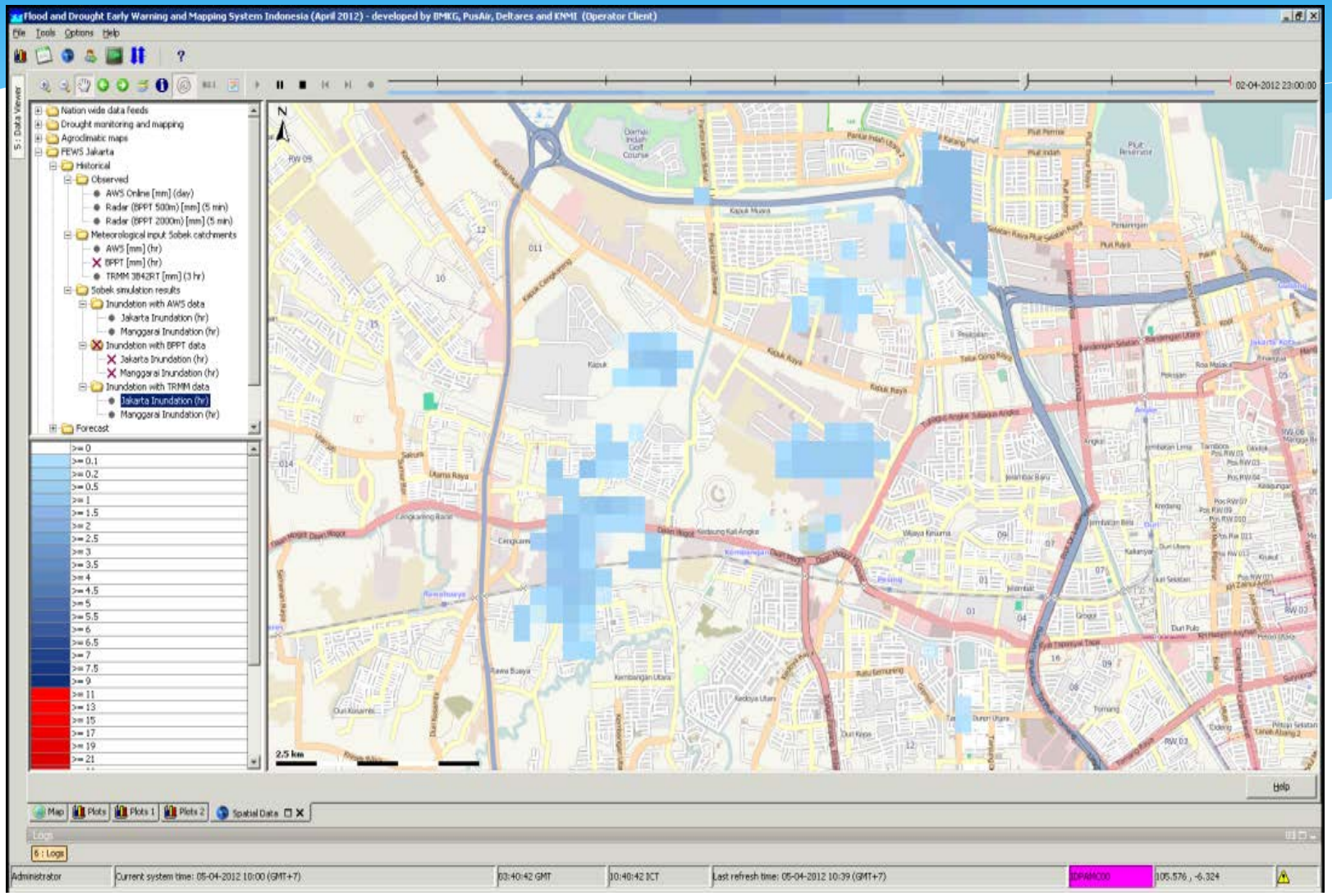

J-FEWS Product

The Progress of CIFDP –I

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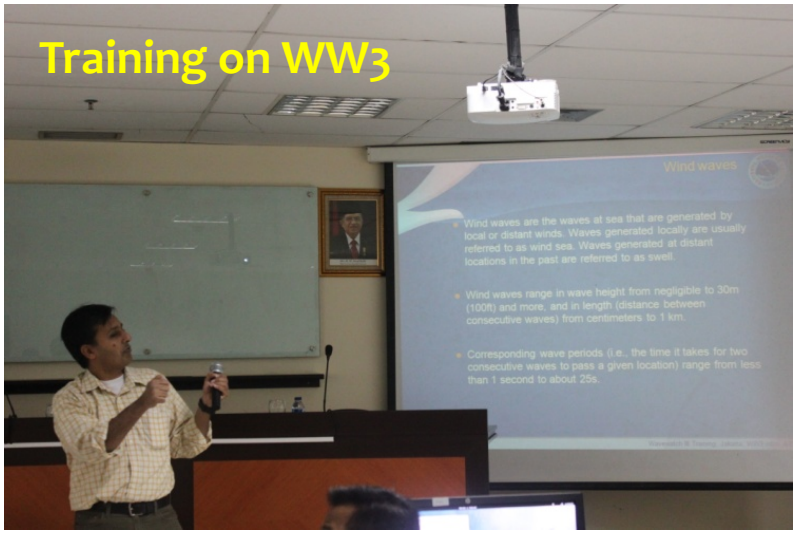
2014:

1. Workshop on Review Phase 1 and Kick Off Phase 2 (Yogyakarta ,Oct, 2014)

2. Training on WW3 by NOAA Expert (Dr. Arun Chawla)



The Progress of CIFDP –I (cont..)

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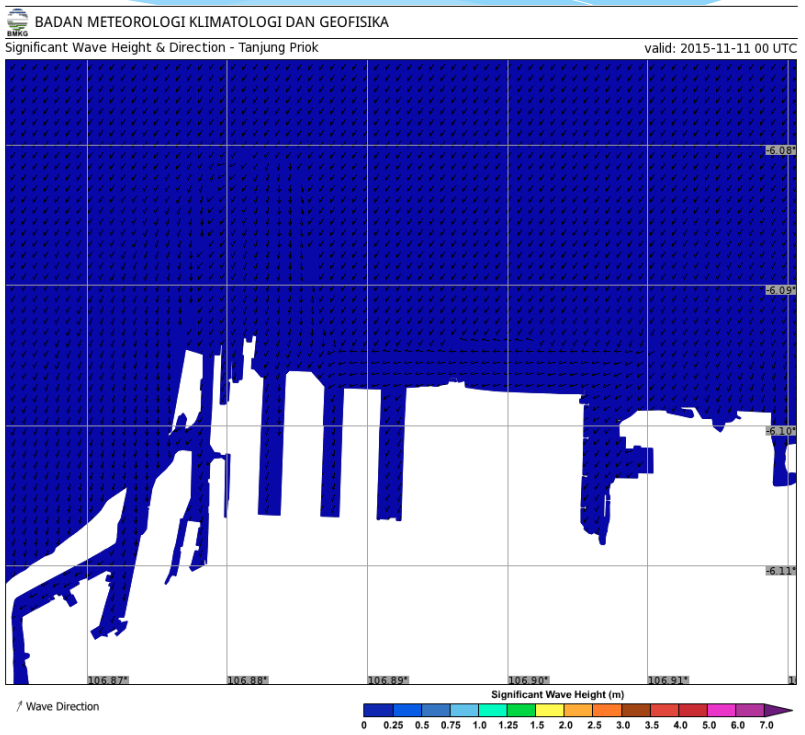
Phase 2: System Implementation (2015)

2015:

1. Delft 3D training by Deltares (provide initial knowledge regarding Delft3D model – June 2015)
2. Implementation the nested WAVEWATCH III (WW3) + SWAN wave model (Nov. 2015)
3. Advance training on Delft3D (Dec 2015)
4. Coupling Delft3D with the wave model (WW3+SWAN)
5. Model Validation



Nested WW3+SWAN for Tanjung Priok Area (Jakarta)

Nested WW3-SWAN and Delft3D

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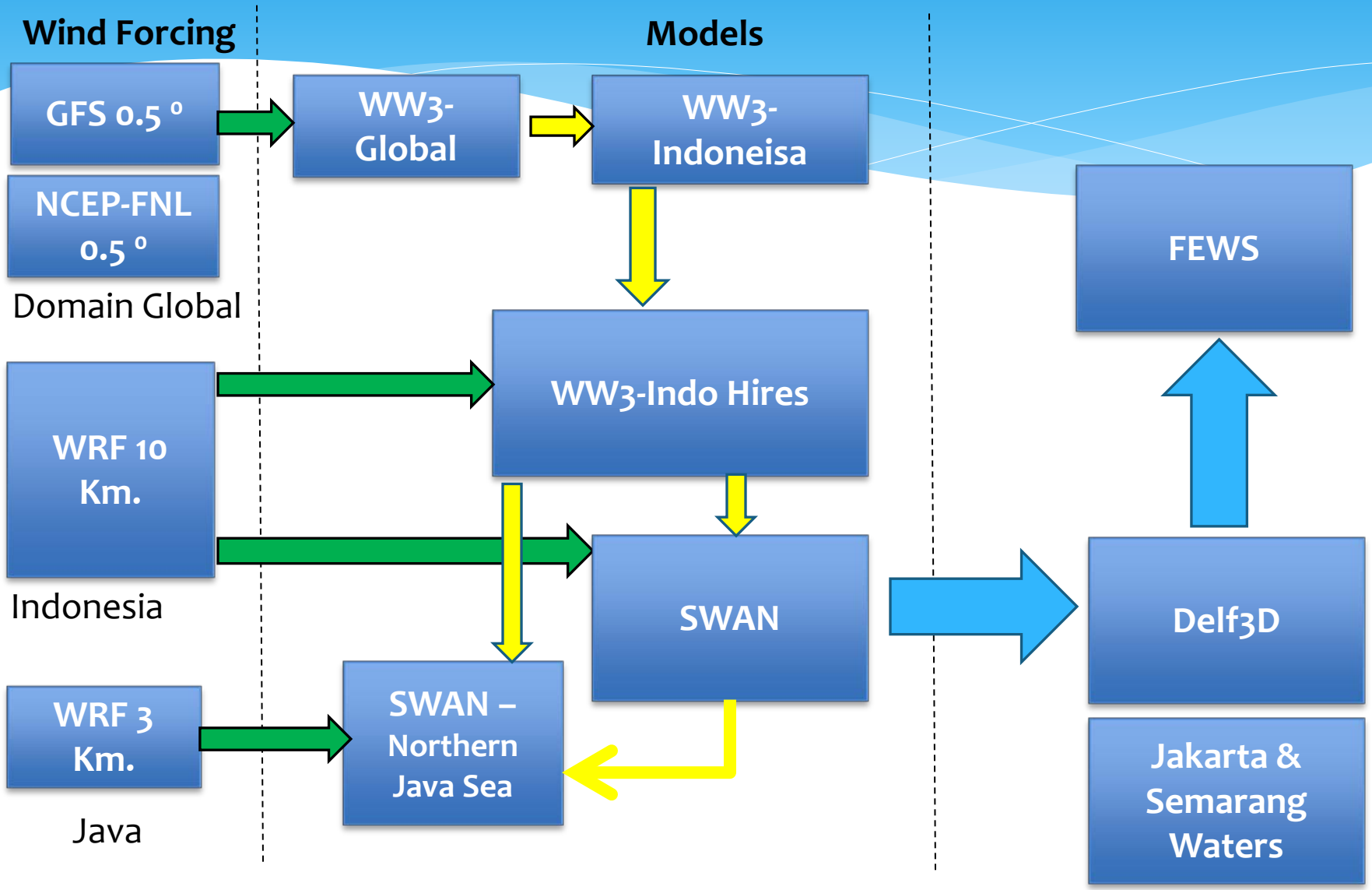

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On Progress : (2015 – 2016)

Providing In-Situ Observation to validate the model

Coastal Buoy , Tide Gauge

@Northern Coast of Java

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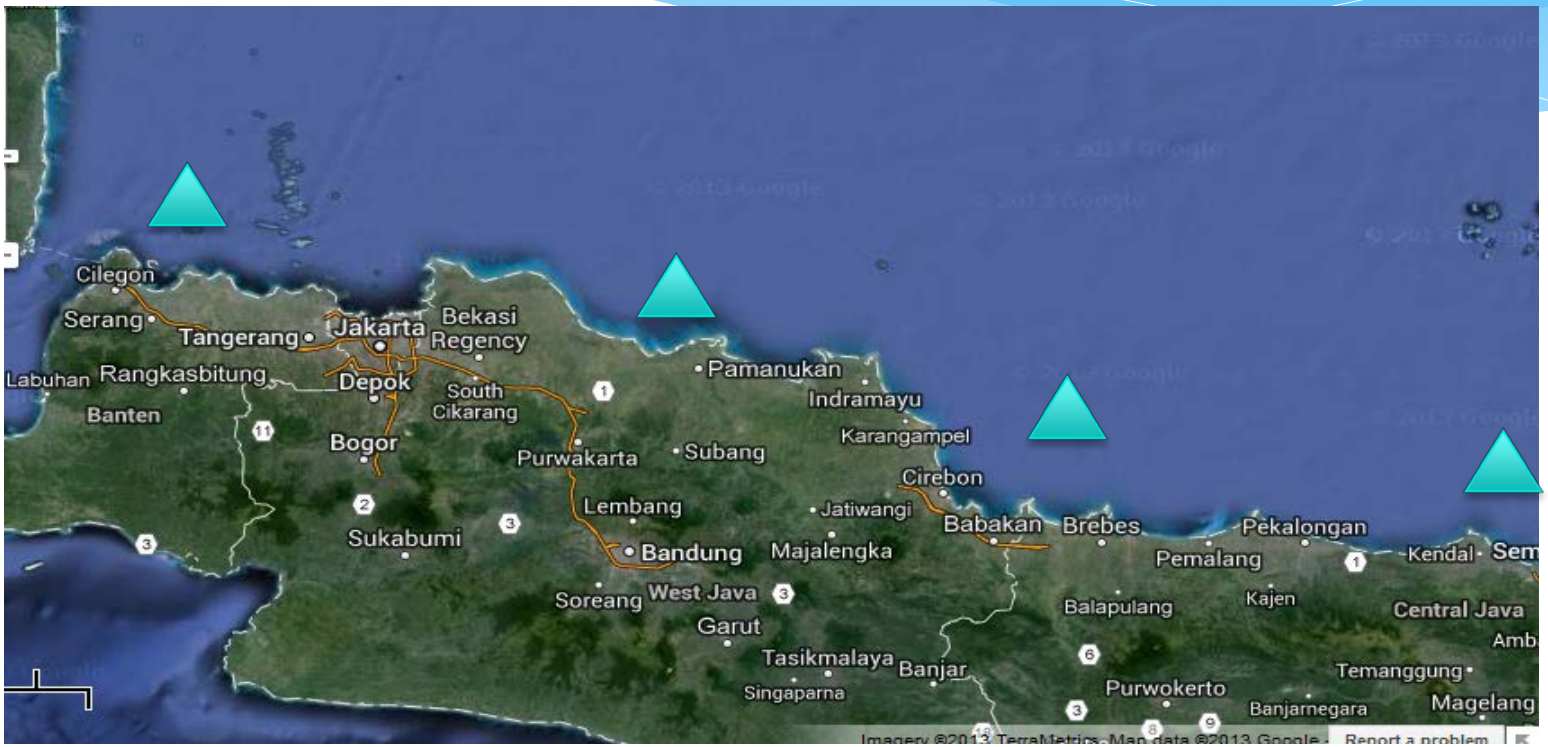

The Way Forward

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Continuing Phase 2: System Implementation

2016:

1. Coupling Delft3D with Indundation model (Sobek Model)
2. Integrating Delft3D with FEWS System
3. Pre-Operational testing
4. Model Validation
5. Workshop (Simulated Multi-agency Exercises and Technical Training for users)

Phase 3 : Testing and Operational (2017)

2017:

1. Developing the operational dan disemination system for CIFDP
2. Live running & Evaluation

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=Thank You=