

Contribution of
CENTER for CLIMATE CHANGE and AIR QUALITY
(CCAQ)
OF BMKG
in the


YEAR OF MARITIME CONTINENT

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Director

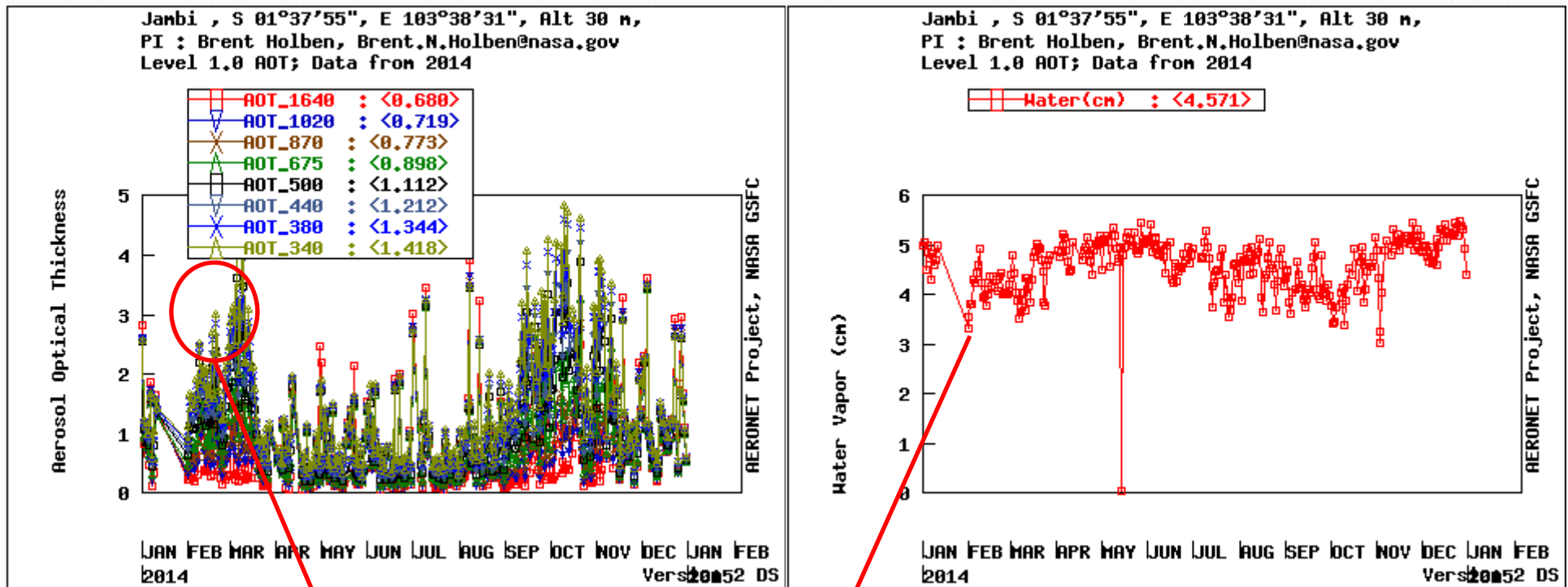
FIRST INTERNATIONAL SCIENCE AND PLANNING WORKSHOP ON YMC, SINGAPORE 27-30 JANUARY 2015

YMC FOR CLIMATE CHANGE AND AIR QUALITY (CCAQ) CENTER of BMKG

- CONCERN ON AEROSOL MONITORING
- OPPOTUNITY TO WORK WITH PARTNERS (NASA, UNIVERSITIES, OTHER CENTERS)
- AS IN 7SEAS WORKSHOP AT CITEKO 2014, IN THE YMC PROGRAM NASA WILL EXTEND THE AERONET SITE IN SUPERSITE OF YMC AND AT GAW SORONG, PAPUA

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- AERONET; SUNPHOTOMETER for AEROSOL and WATER VAPOR measurement
 - Current AERONET locations in INDONESIA; JAMBI (SUMATERA), KALANGKARAYA (KALIMANTAN), BANDUNG (WEST JAVA)

Example AOT and Water Vapor from AERONET

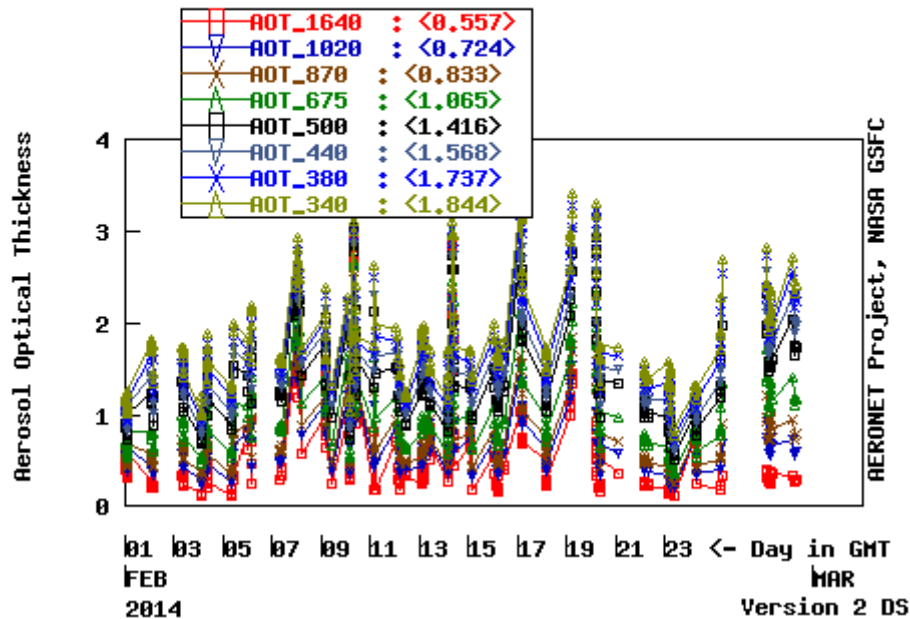


heavy aerosol

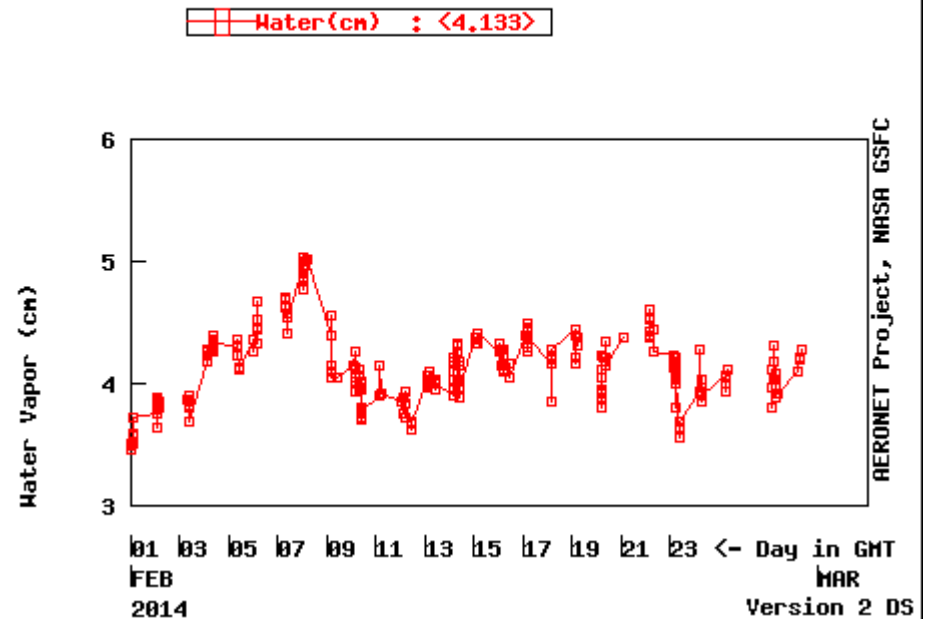
less water vapor

AOT and WV FEBRUARI 2014

Jambi , S 01°37'55", E 103°38'31", Alt 30 m,
 PI : Brent Holben, Brent.N.Holben@nasa.gov
 Level 1.0 AOT; Data from FEB 2014

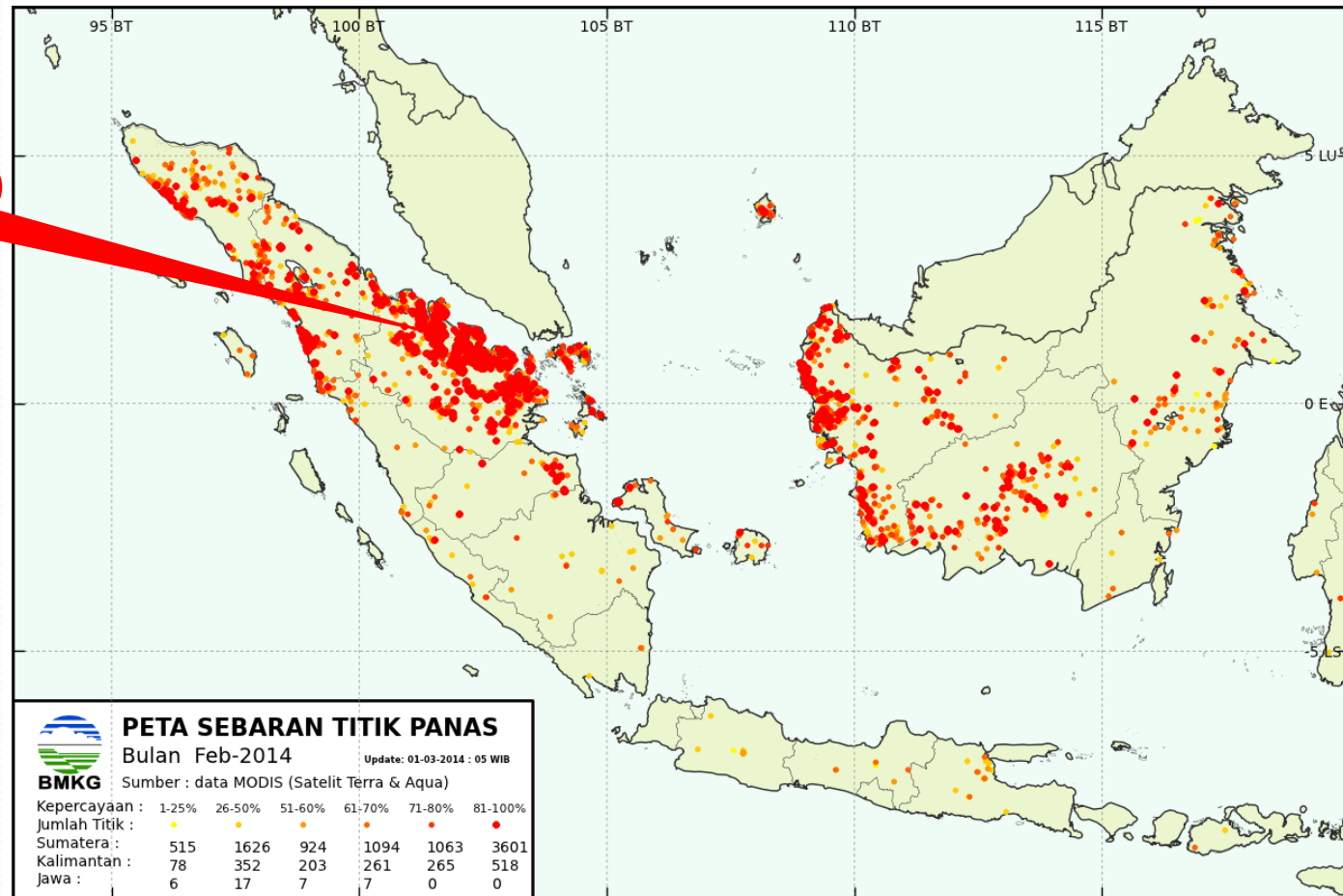


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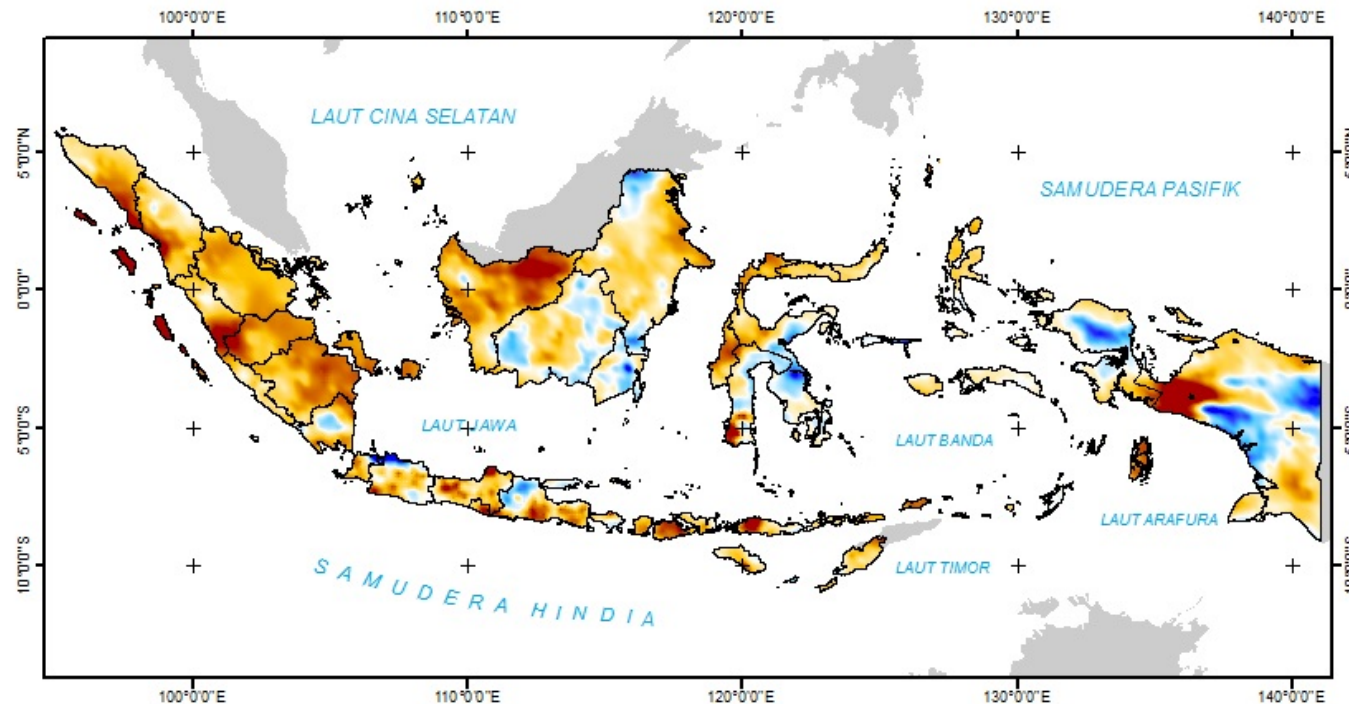


Hotspot number in February 2014

many hotspots



Rainfall anomaly in February 2014

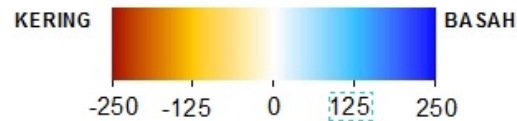


PETA ANOMALI CURAH HUJAN
FERUARI 2014 TERHADAP
NORMAL FEBRUARI 1981-2010
INDONESIA



BADAN METEOROLOGI KLIMATOLOGI DAN GEOFISIKA

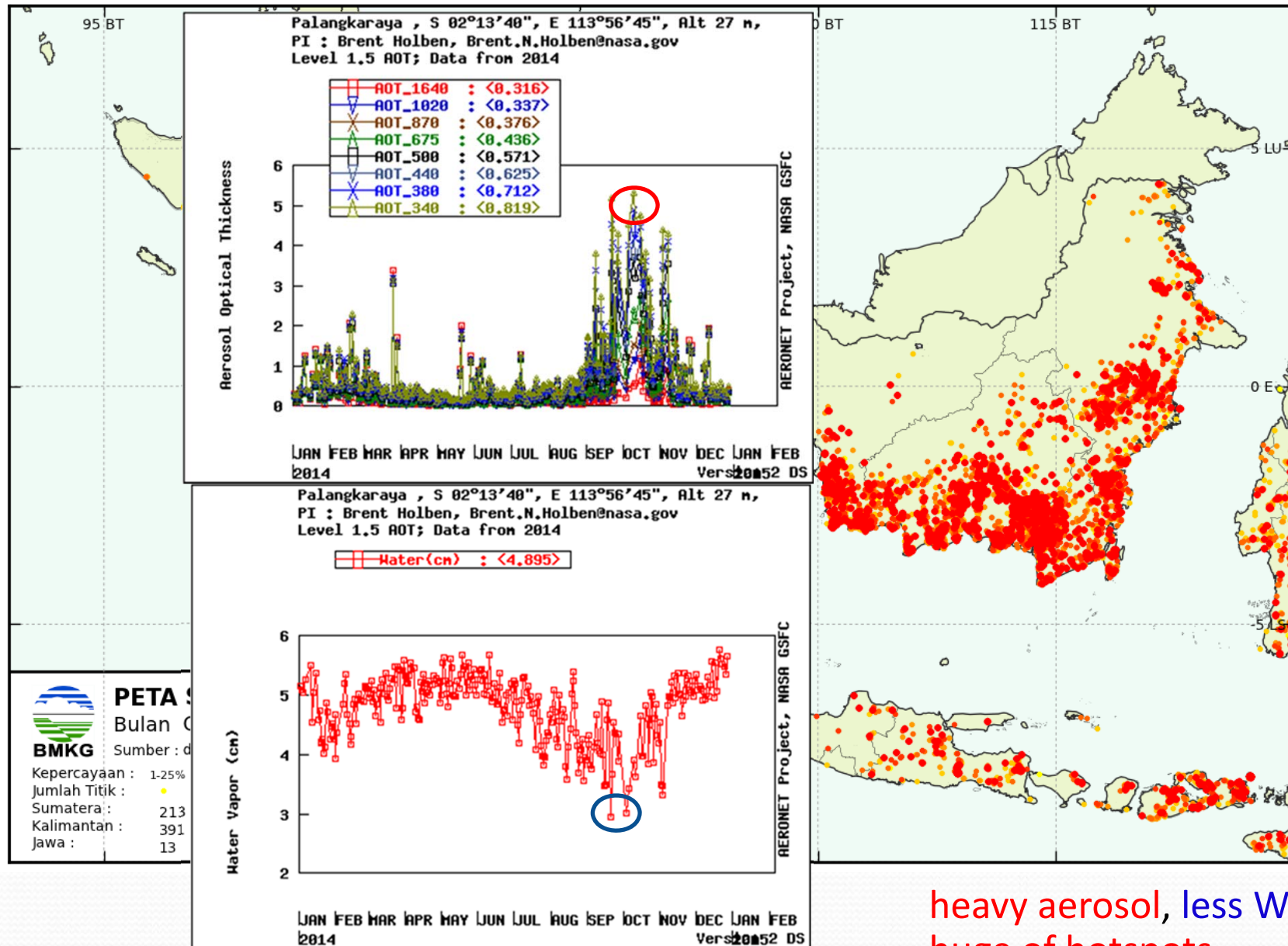
ANOMALI CURAH HUJAN (MM) :



0 90 180 360 540 720
Km

SUMBER DATA :
1. Peta Rupa Bumi BMG Skala 1:250.000
2. Data Curah Hujan Sampel Dengan Cakupan 11
Desember 2014 BMKG

Hotspot number in October 2014, AOT and WV in Palangkaraya





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- AERONET (Brent Holbent, NASA, 7SEAS, work w/ CCAQ Center of BMKG)
- MPLNET (Micro Pulse Lidar Network, work w/ R&D Center of BMKG); Judd Welton, NASA).
- AEROSOL-CLOUD INTERACTION (Jeff Reid, NAVAL RESEARCH LAB, GROUP LEADER 7SEAS, work w/ CCAQ and R&D Centers of BMKG)

Benefit

- Extend the coverage for data which is useful for particulate information as well as for research purpose.
- Model validation
- Input for model parameter
- YMC has a wide aspects of research theme, one principal for National Weather Services such as BMKG;
From RESEARCH to OPERATIONAL



NATIONAL PLANING (2015-2019)

- Installing the PM_{2.5} Instrument in 8 Forest Fire prone provinces and competing the PM₁₀ national wide
- Completing the 2 GAW stations in Palu and Sorong (GHG, RADIATION, AEROSOL, WEATHER)
- Indonesian air quality index
- Modeling air quality and pollution dispersion
- Aerosol-cloud interaction for climate model
- Propose to imo for collaboration on monitoring the aerosol and GHG in the ships (IMO's submission note to the UNFCCC)



Past aerosol field campaign study

2005 Aerosol study in South Sulawesi with a Cheyenne II Aircraft

- 1 Cheyenne II prop-jet aircraft including 100 hrs of flight time in all weather conditions.
- 2 Captains for multiple seeding missions during day and/or night, 24/7.
- Airlink telemetry system for tracking
- 1 dedicated mechanic.



Primary Aircraft Instrumentation

- **State parameters**
 - Total Temperature
 - Dew point temperature
 - Pressure
- **Additional Parameters**
 - Cloud liquid water
 - GPS position
 - Differential pressure for air speed

Special Research Aircraft Instrumentation

- For 30 days of intensive research (April).



The PMS-OAP-2D-P measures the sizes and shapes of particles from 200 μm to 6.4 mm, with 200 μm resolution. These particles are primarily precipitation, hence the “P” designation.

PMS 2DC particle imager



Hygroscopic Flares



Data Acquisition system



CCN Counter

Cloud LWC sensor



Research Aircraft N233PS



AgI Flares



PMS PCASP Aerosol Counter



AgI Ejectables



PMS FSSP counter





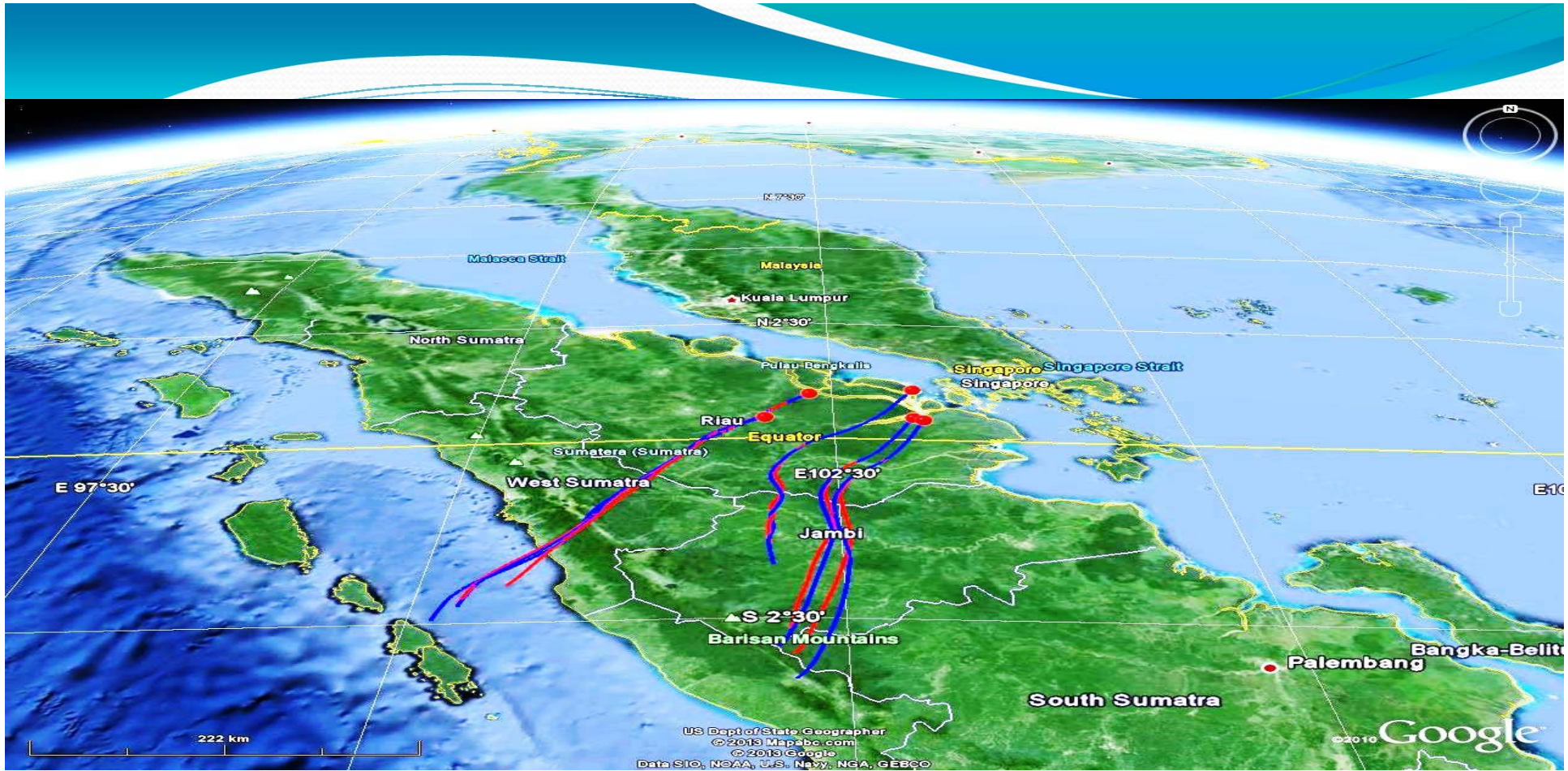
YMC planning

- The YMC will cover a period including both winter and summer East Asian/Australian monsoons: April 2017 – October 2018. It is envisioned that a sequence of intensive field campaigns will take place in the MC region during the YMC.
- These campaigns will focus on various topics, such as biomass burning aerosol and their interaction with convective clouds, the diurnal cycle in cloud and precipitation, evolution of the cloud population through the local life cycle of the MJO, ITF transport, dynamics and air - sea interaction of the marginal seas, and troposphere - stratosphere interaction, among others.



Key aerosol question in MC

- What drive the interaction between climate and forest fire
- How the climate aerosol interaction (wet deposition)
- The role of land sea breeze to aerosol distribution
- The role of intraseasonal interaction to aerosol distribution
- Aerosol and cloud formation over the tropics (air field campaign)



Thank you