

INDONESIAN SEA OBSERVED BY SATELLITES

Keynote Speakers of The 1st Warmadewa University International Conference on Architecture and Civil Engineering (WUICACE) on 20th October 2017

Prof. Tasuku Tanaka, Ph.D.

Graduate School of Science and Engineering Yamaguchi University, Japan

I had been a Guest Professor and Director, Center for Remote-Sensing and Ocean Science, Udayana University. I have been doing lectures and research in UNUD since 2009. I was also a professor, Yamaguchi University. I retired all the assignments on March 31 2017. My research field is Satellite Remote-Sensing and Space Engineering. I had been working for Japanese space agency called “JAXA” for more than 30 Years. Today’s topic is one of my latest research theme “ Long Time Observation of the Earth from Space”, specifically on “Indonesia Water”.

1. Introduction

It was Sep. 16, 2015 that I flew from Tokyo to Bali for UNUD. I noticed a newspaper headline: “El-Nino seen likely to persist until 2016”

(Wall Street Journal: Sep. 16, 2015). I imagined that El-Nino 2015-2016 might be as strong as El-Nino 1997-1998. But El-Nino 2015 vanished soon.

I recognize that our understanding is still too poor to predict the abnormal weather just only several months ahead.

2. Indonesia Sea

Indonesia sea or Indonesia archipelago is considered as the main engine of the world climate system. The heated warm sea in this region is the origin of the cycle: High Sea Surface Temperature-Upwelling of Water Vapor-Steep Pressure Gradient- Precipitation.

3. General Characteristics

Since 1980’s the world space organizations have been cooperating to measure key climate parameters: Sea Surface Temperature (SST), East and West Wind (U-WS), and Precipitation(PR). We have now nearly 20 years record about them. Inspecting those data we have got interesting facts that have been vaguely known but not yet definitely recognized. The main characteristics of the Indonesia (17.5deg NS, 90-180deg E) is summarized

- (1) Whole Area for SST, U-WS, and PR
- (2) Seasonal and 6months Changes for SST, U-WS, and PR
- (3) Relationship between SST and PR

4. Regional Characteristics

Dividing the Indonesia Sea into 12 small areas, we analyses the seasonal changes of SST, U-WS and PR.

- (1) Seasonal change varies from one area to another. No unified seasonal change is recognized.
- (2) In the inner Indonesia sea, the wind direction changes from East to West. But in outer sea, the direction does not change only in the change of velocity.
- (3) High Precipitation area are High Mountain Area, ITCZ and Southern ITCZ
- (4) Several peculiar characteristics are observed.

5. Conclusion

- (1) “Normal condition” of Indonesian sea are revealed, by satellites’ 18 years data.
- (2) Seasonal variability is prominent in SST, UV-W and RR;
6 Months Variability is Weak (Cycle of Sun Movement):
Effect of monsoon is prominent rather than tropical phenomena.
- (3) PR is strongly influenced by High Mountains.
- (4) There exists high correlation between SST and PR
- (5) 2016 El-Nino suddenly disappeared. Why?
- (6) Further investigation is needed