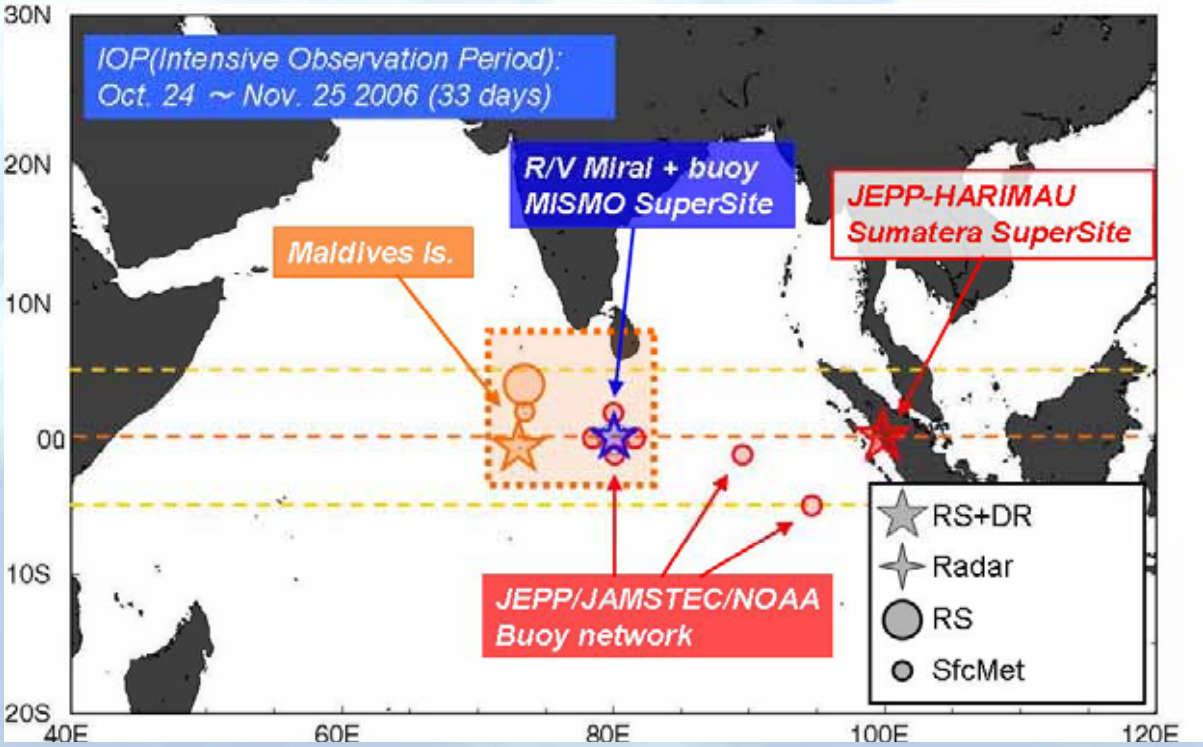
The impact of the assimilation of additional sondes during MISMO in ALERA



Qoosaku MOTEKI

K. Yoneyama・M. Katsumata・R. Shirooka・N. Sato・K. Yasunaga・H. Yamada・M. Fujita・A. Seiki・M. Yoshizaki：JAMSTEC/IORGC

T. Enomoto：JAMSTEC/ESC

T. Miyoshi：JMA

S. Yamane：Doshisya Univ.

T. Ushiyama：National Institute for Agro-environmental Sciences

A new type of the objective analysis "ALERA" (AFES-LETKF Experimental ReAnalysis)

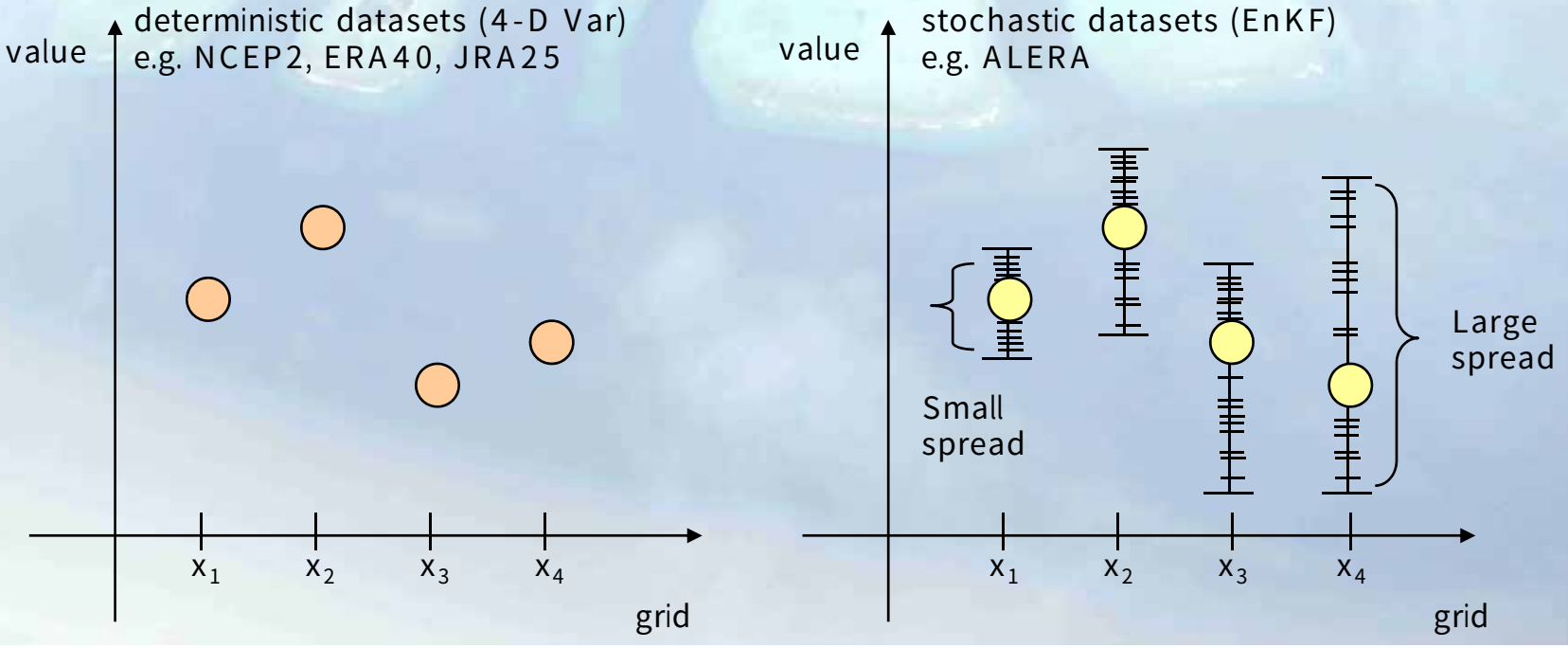
The objective analysis dataset produced by JMA, JAMSTEC/ESC, and Chiba Institute of Science using an ensemble Kalman filter

ALERA dataset with the assimilation of the MISMO sondes	ALERA dataset without the assimilation of the MISMO sondes
Impact of the MISMO observations: The difference between the two datasets	

A new type of the objective analysis "ALERA" (AFES-LETKF Experimental ReAnalysis)

The dataset provides

- the analysis ensemble mean of a 40-member (◯)
- the analysis ensemble spread (⌶)
  (reference for the error information).



Normal definition of impact signal

(simple difference between the two datasets)

$$\text{signal} = var_{mismo} - var_{ctl}$$

This may include unmeaning noises associated with the uncertainty of the model!

Definition of "reliable" impact signal

(difference between the two datasets with t-test at the 95% confidence level)

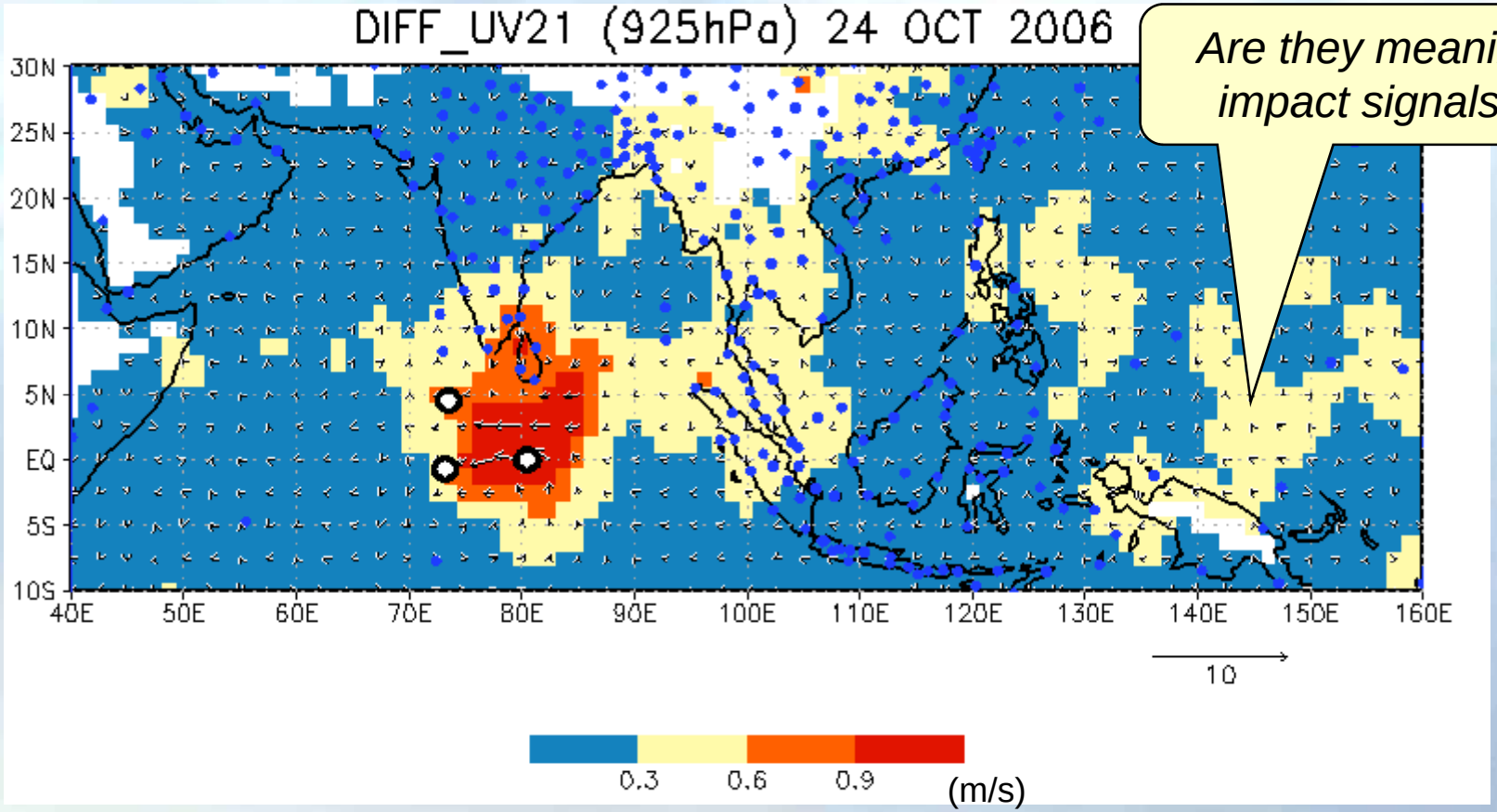
$$\text{signal} = var_{mismo} - var_{ctl},$$

$$\left| \frac{var_{mismo} - var_{ctl}}{\sqrt{((sprd_{mismo})^2 + (sprd_{ctl})^2) / (40 - 1)}} \right| > 1.99$$

Considering the uncertainty of the model

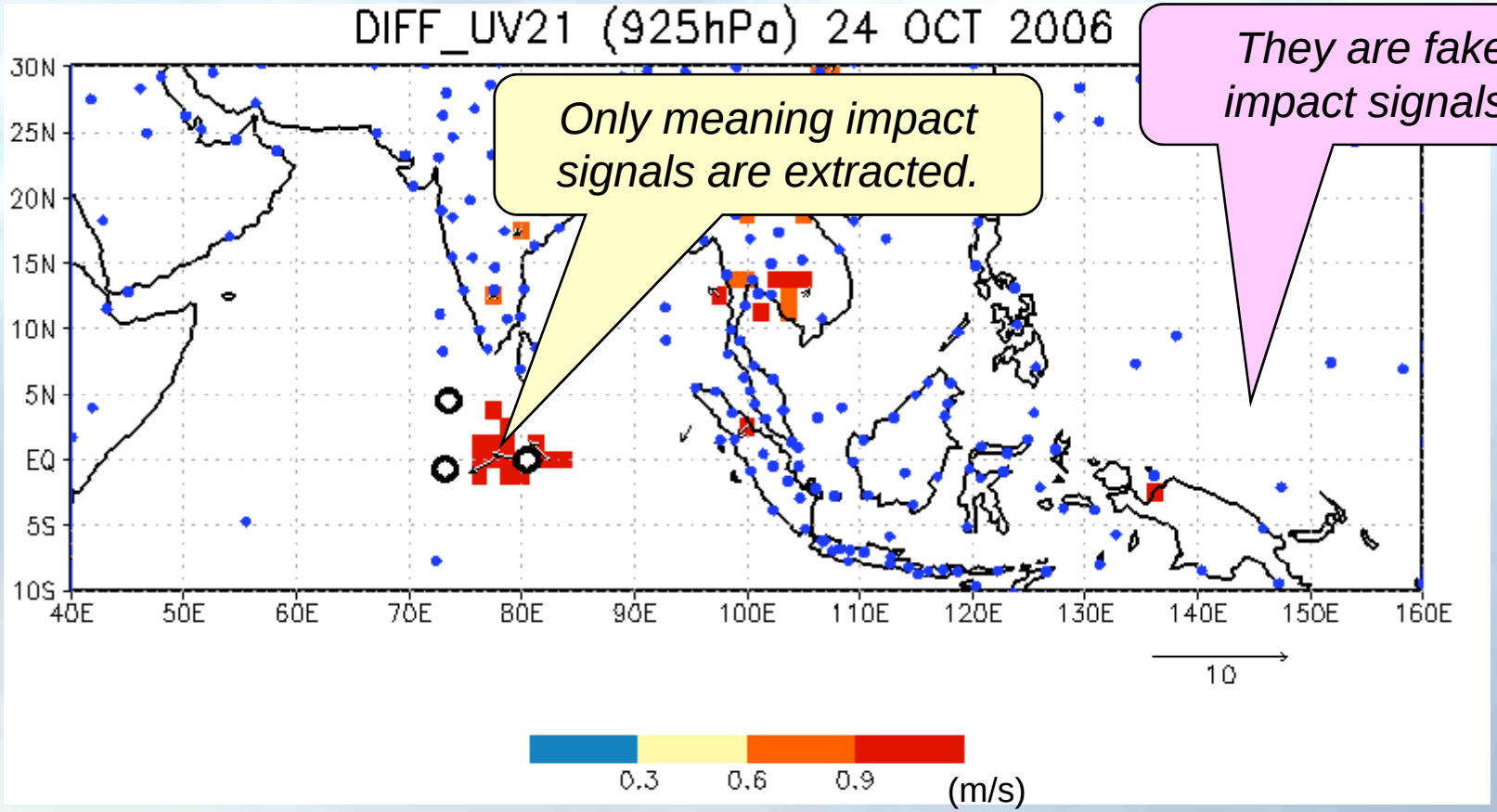
Evaluation of the assimilation impact of observations in ALERA

Evaluated from difference between datasets with and without the observations.



Evaluation of the assimilation impact of observation in ALERA

Evaluated from difference between datasets with and without the observations.

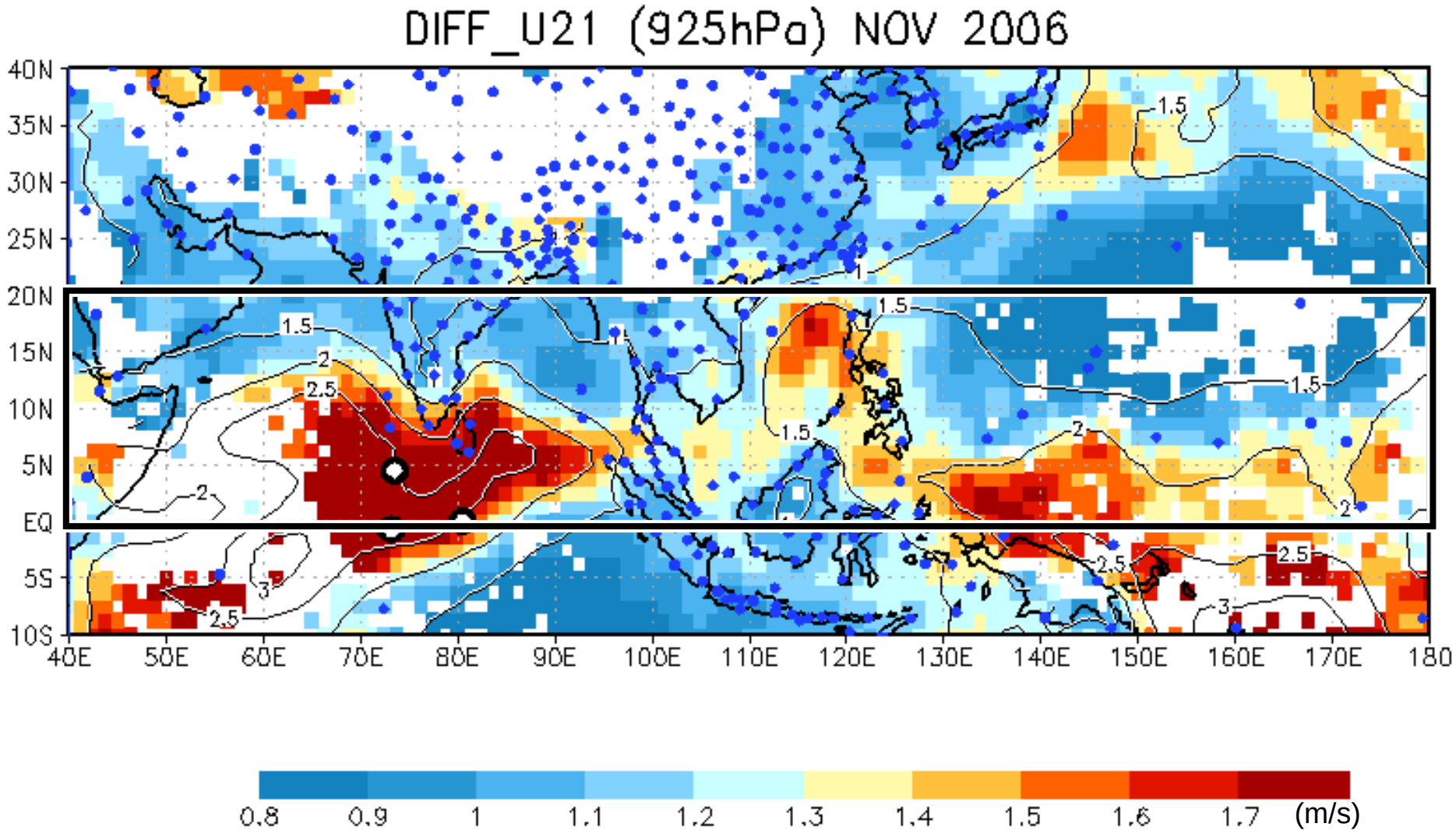


Objectives

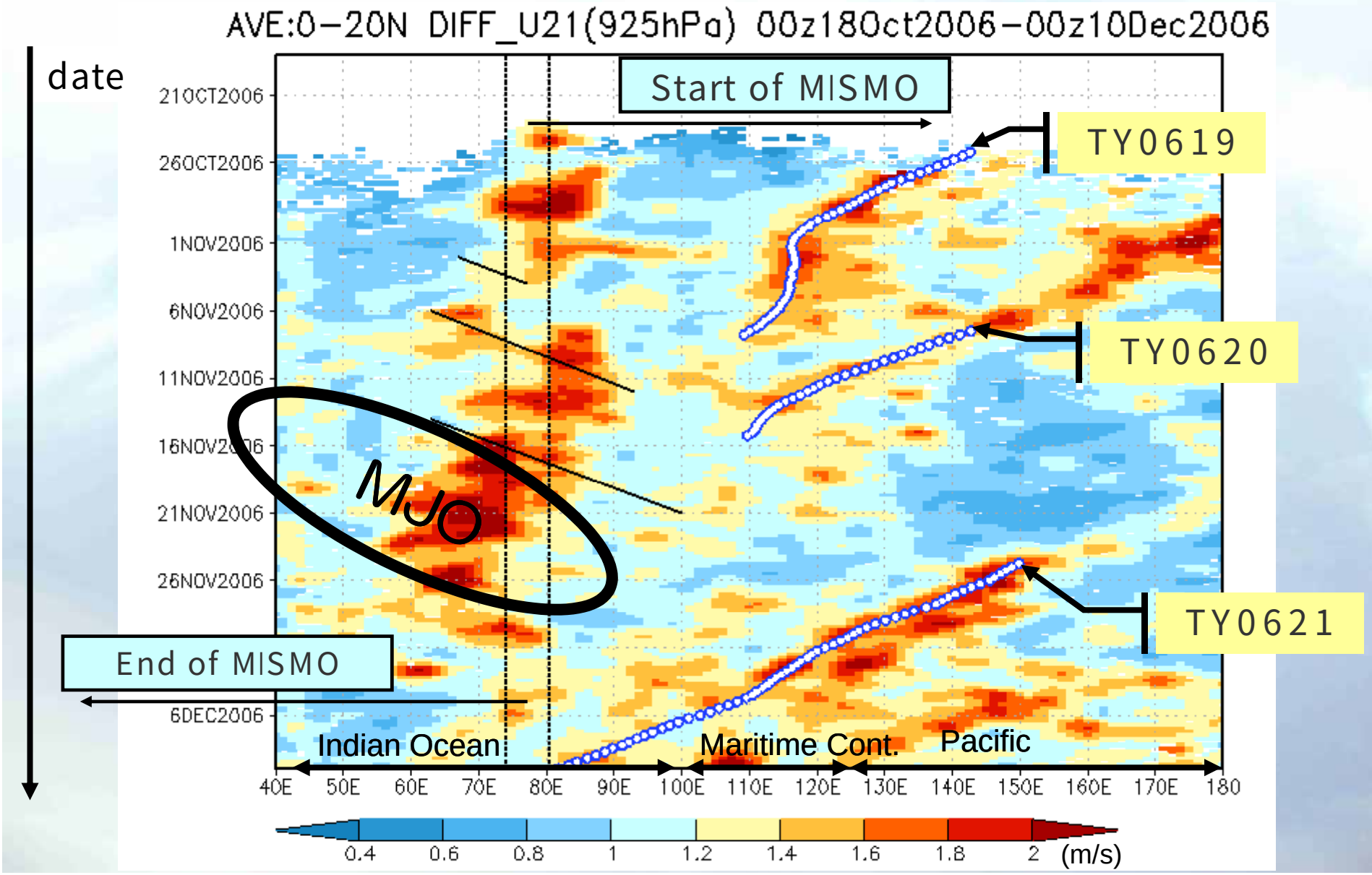
- To reveal regions and phenomena affected by MISMO sondes.
- To reveal propagation processes of additional information with the sondes.

How did they influence on predictability of some phenomenon?

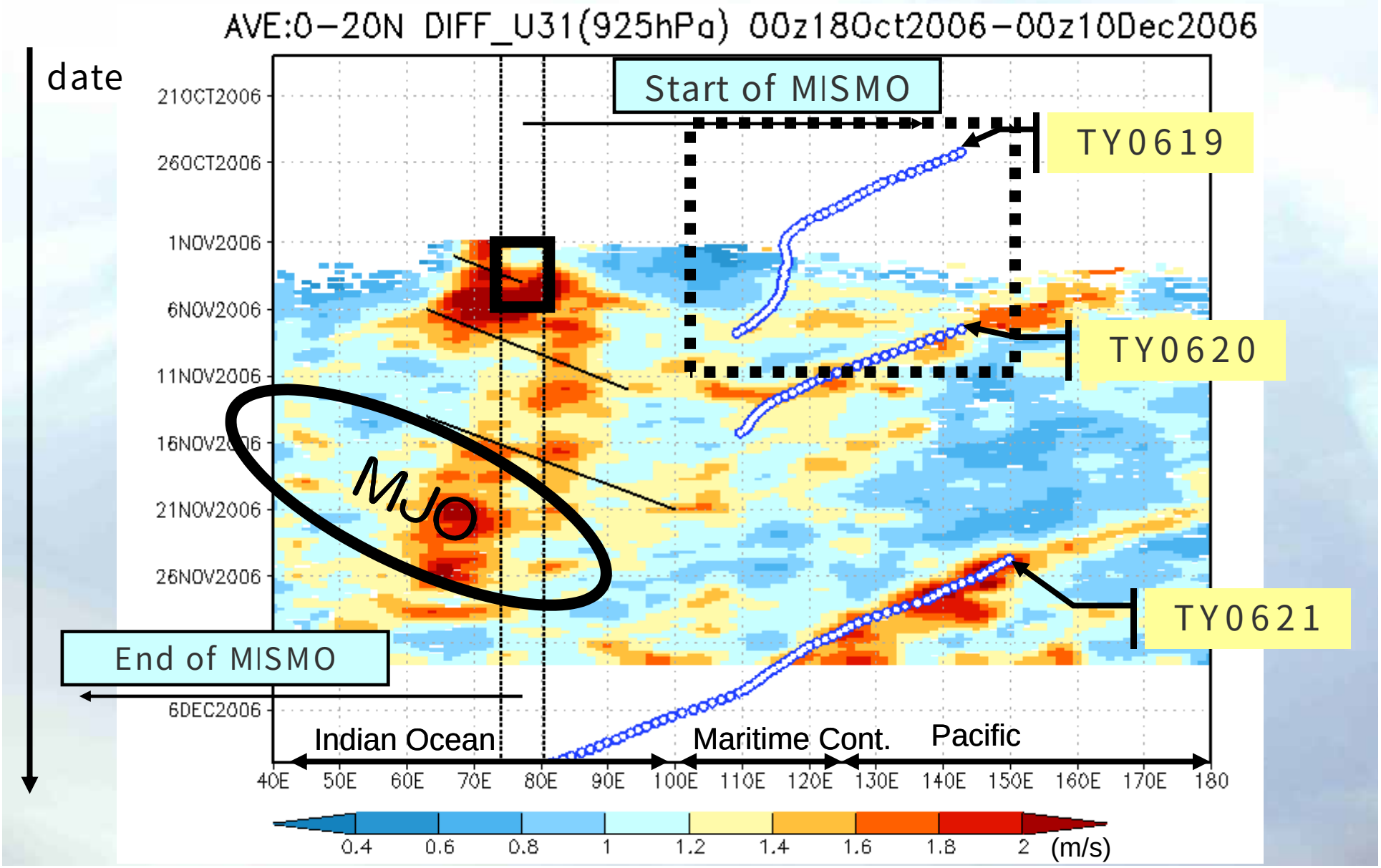
Monthly mean of impact signal



Propagation of impact signal

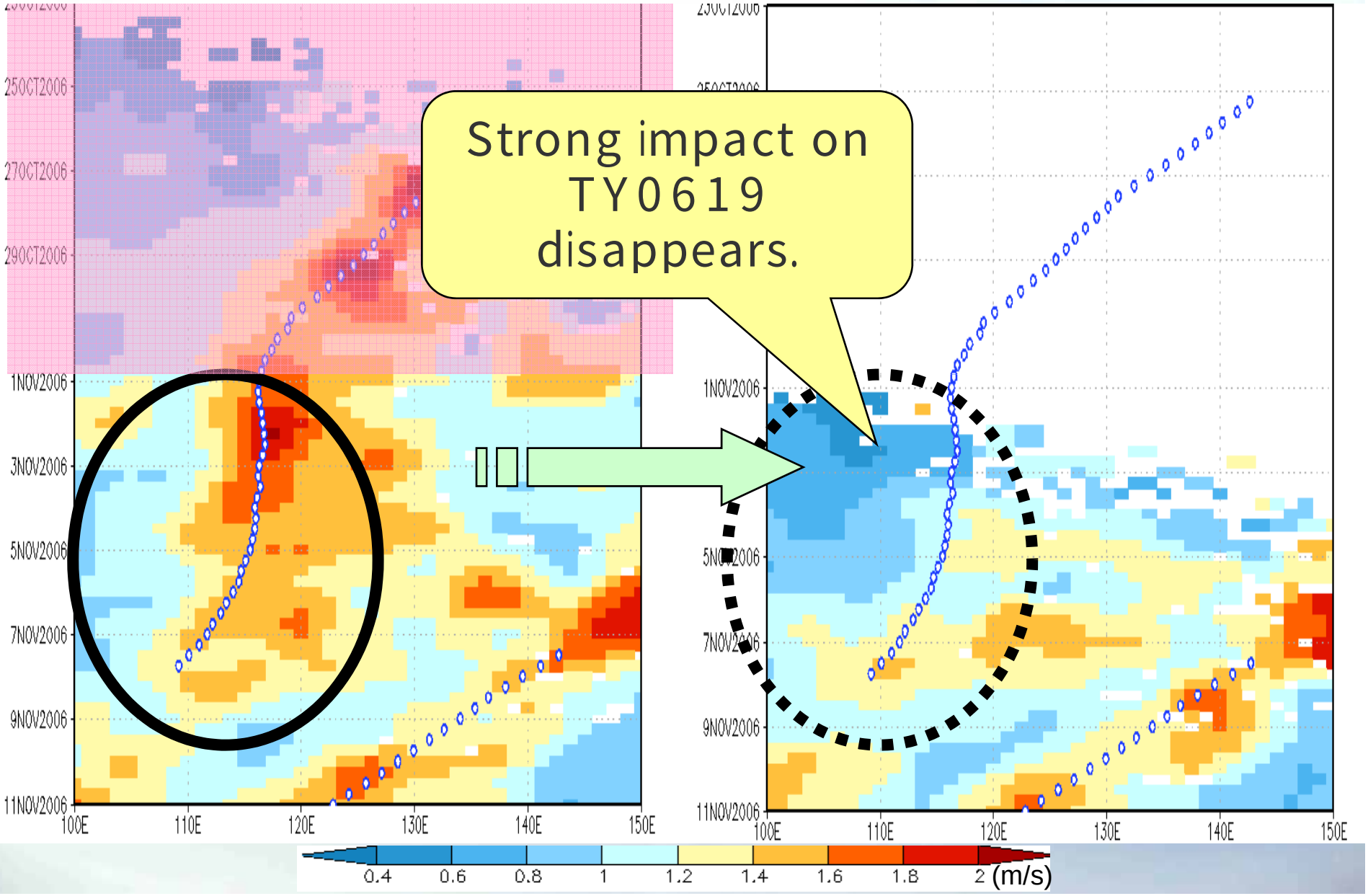


The experiment with 11/1−5 data only

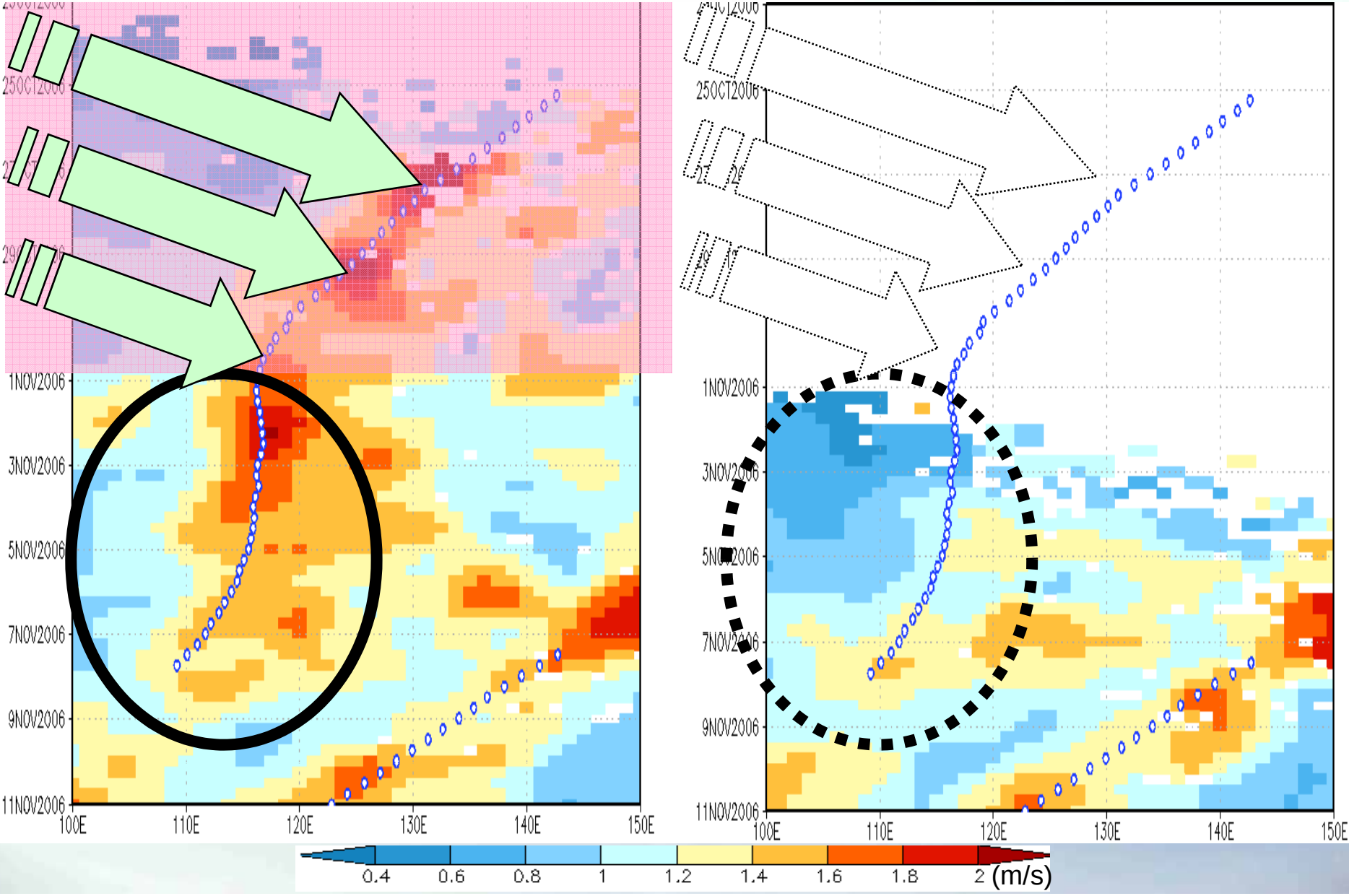


With the whole period

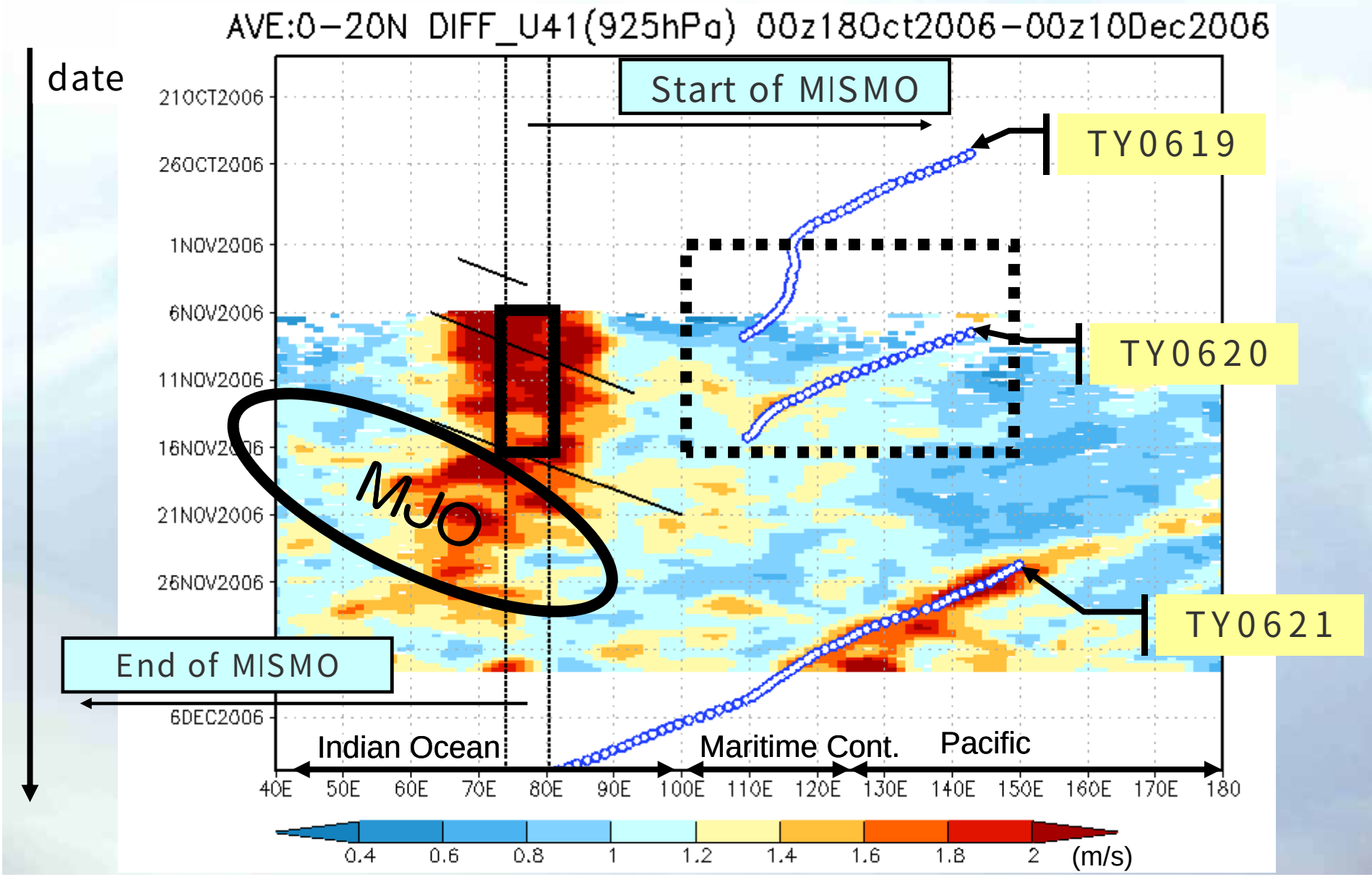
With 11/1-5 only



Westerly waves passing the Indian Ocean before 11/1 is important for TY0619 development?

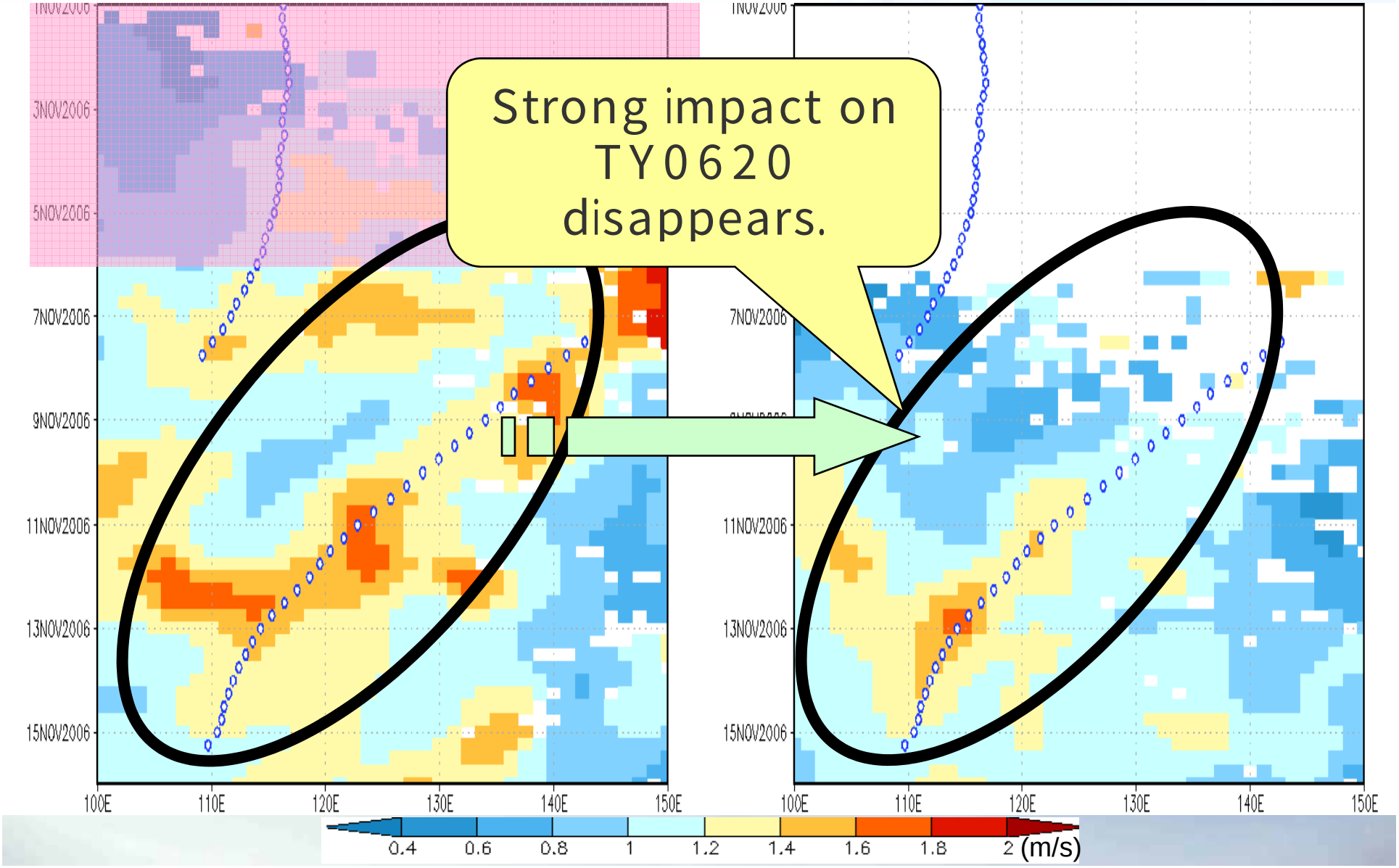


The experiment with 11/6－15 data only

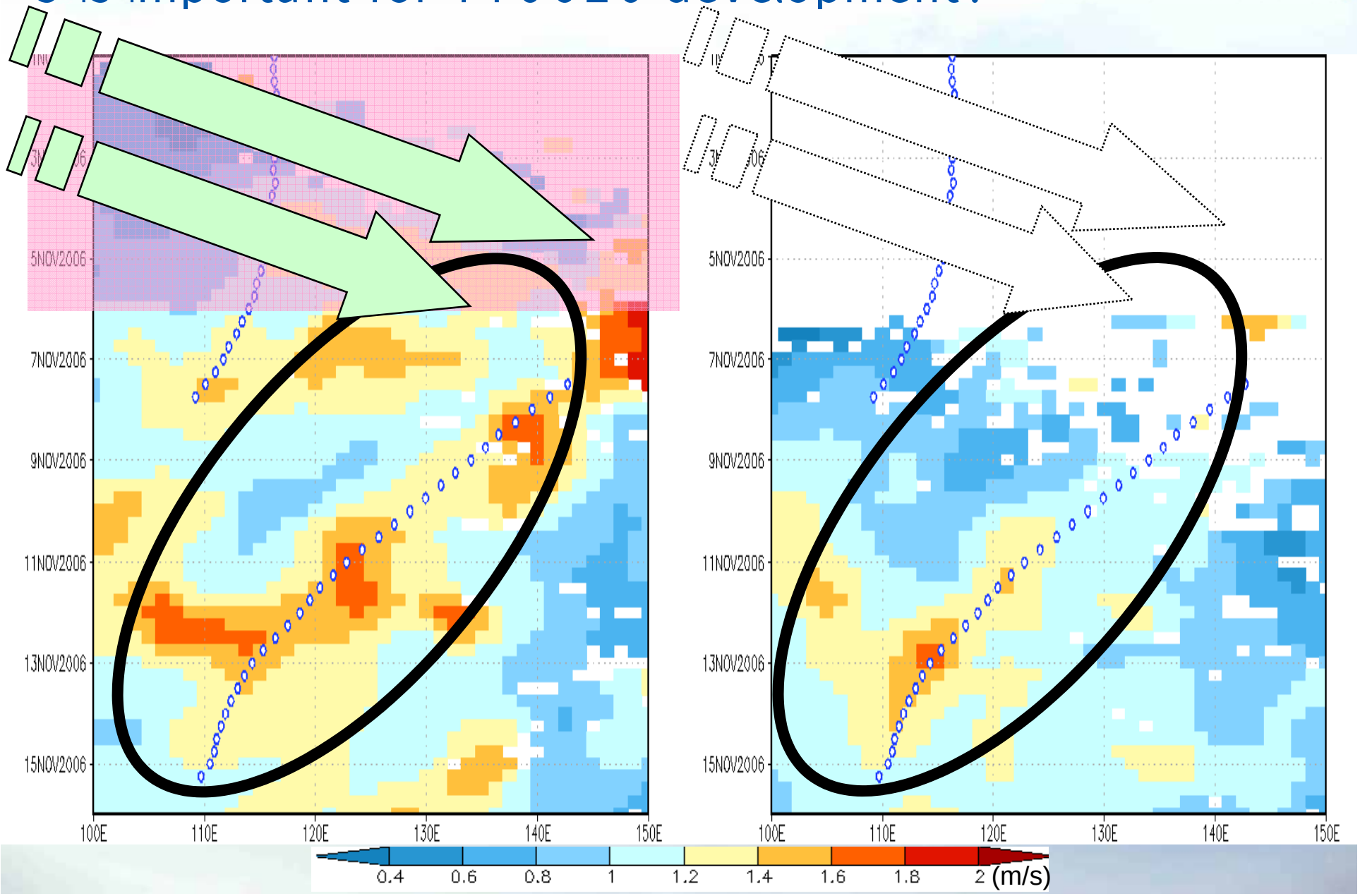


With 11/1-5 only

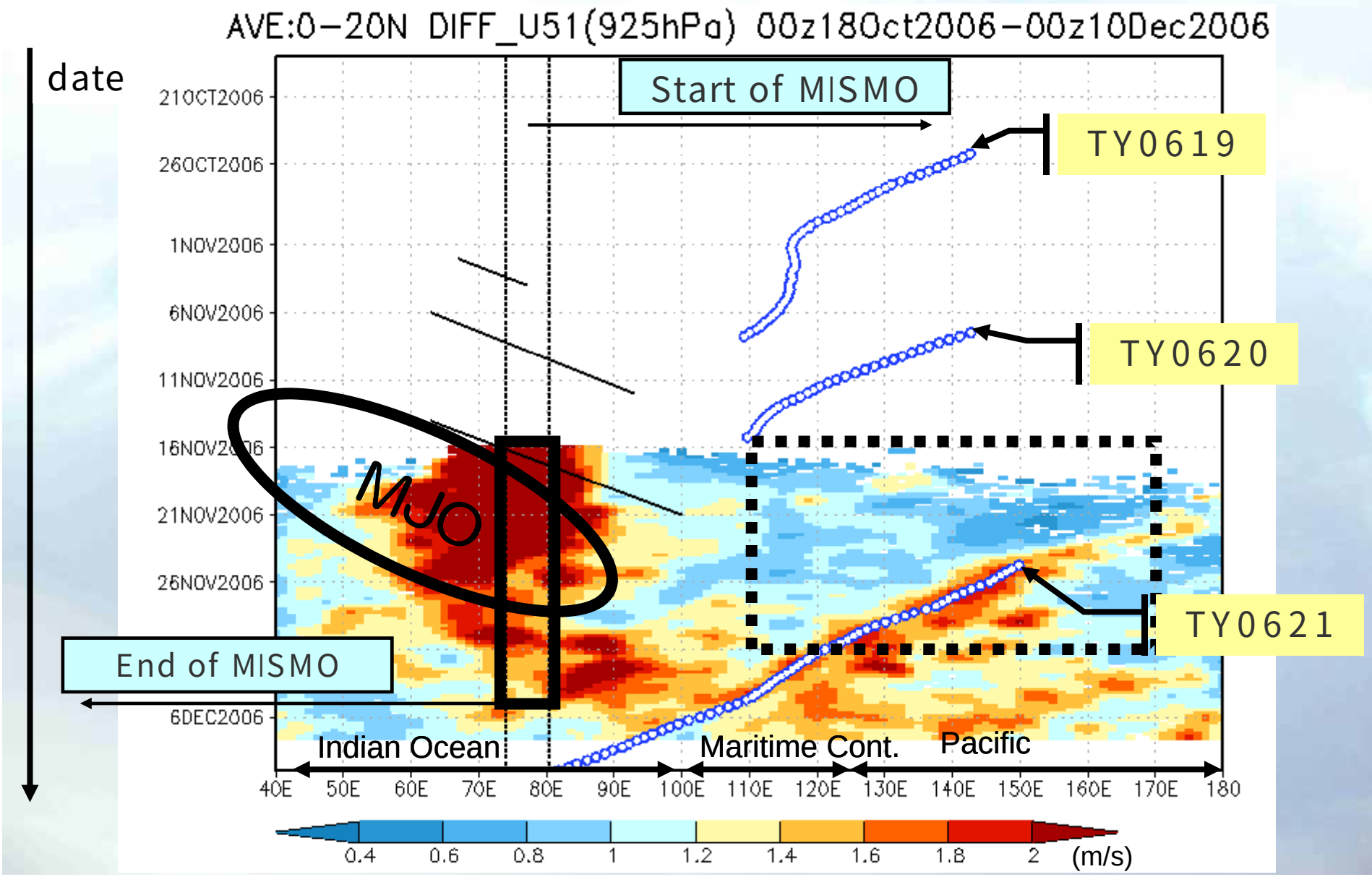
With 11/6-15 only



Westerly waves passing the Indian Ocean during 11/1-5 is important for TY0620 development?

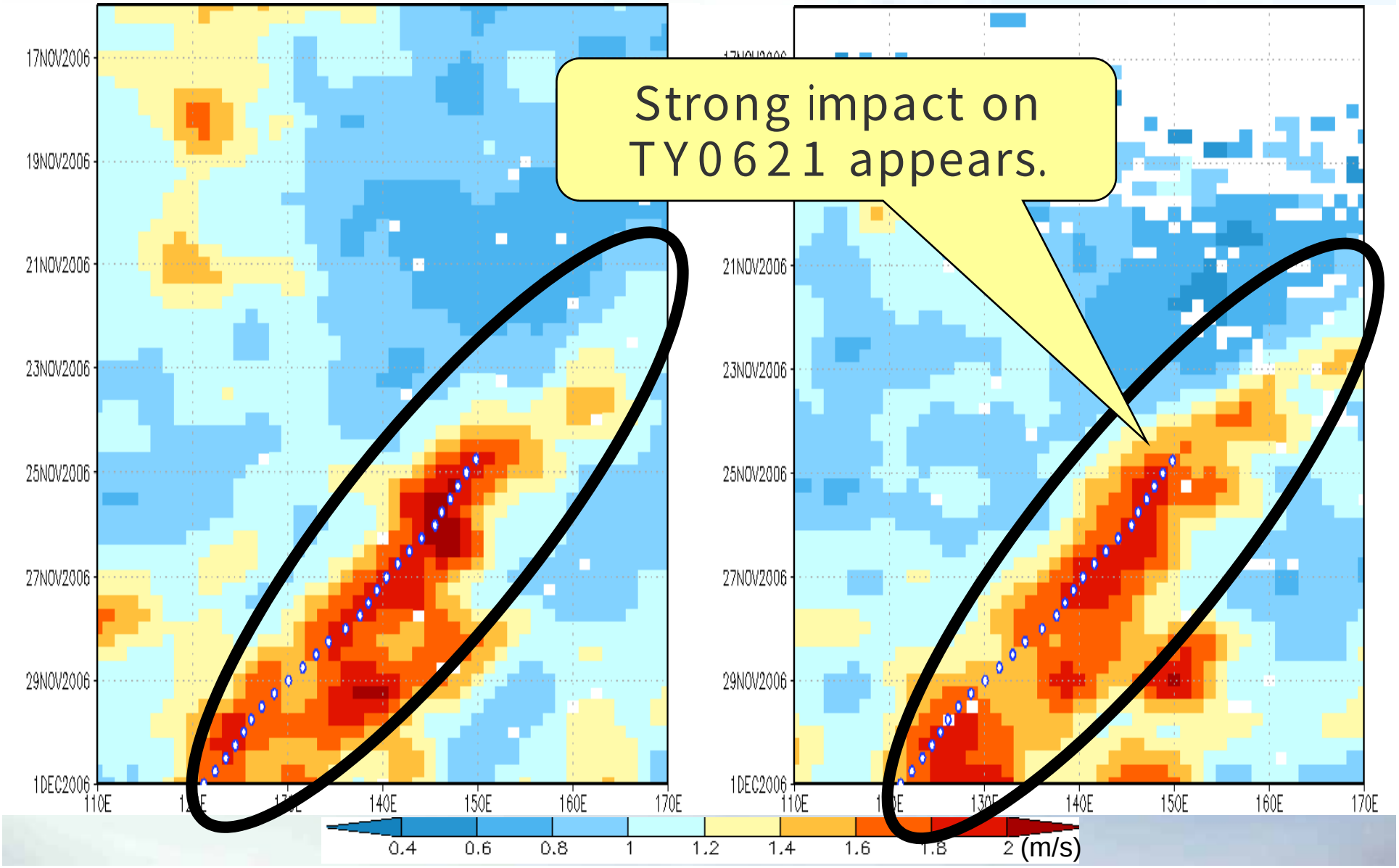


The experiment with 11/16－12/5 data only

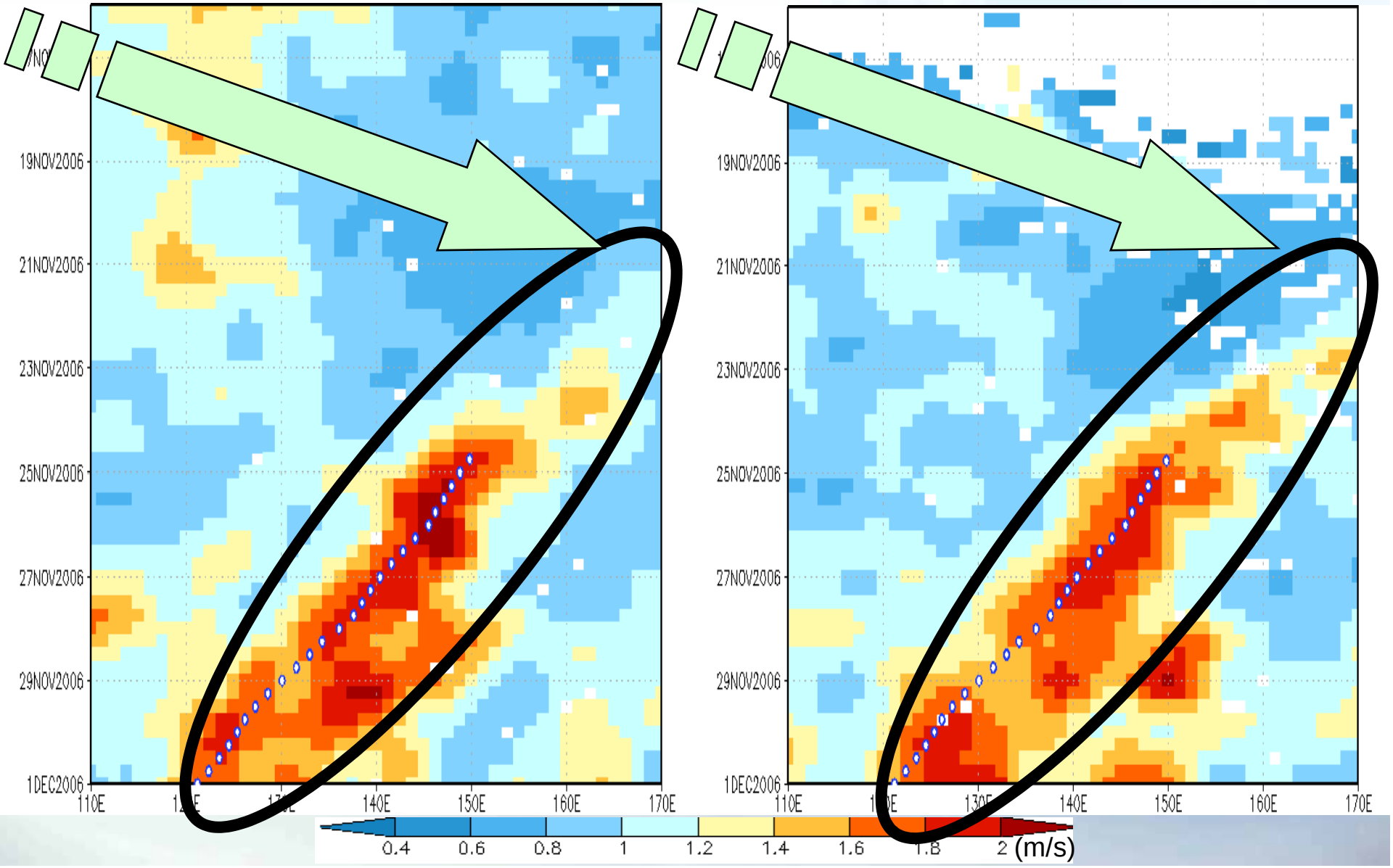


With the whole period

With 11/6-15 only



Westerly waves passing the Indian Ocean after 11/16 is important for TY0621 development?



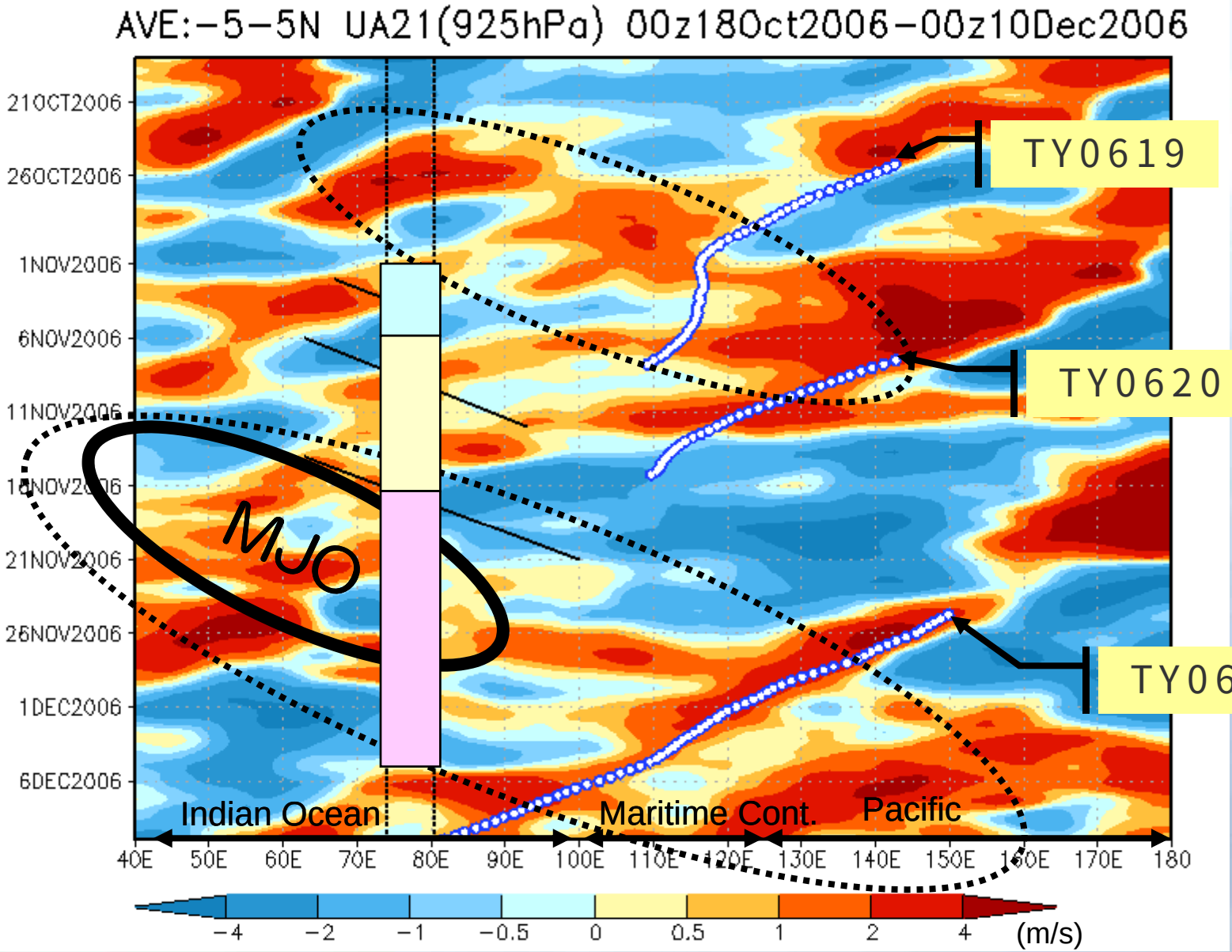
Summary

TY0619：
Affected by W-Wv before 11/1

TY0620：
Affected by W-Wv during 11/1－5

TY0621：
Affected by W-Wv after 11/16

Westerly wind anomaly



Conclusions

MISMO sondes have a great impact on the predictability of typhoons over the tropical western Pacific.

Additional information with MISMO sondes could reach up to typhoons by westerly waves.

TY0619: westerly waves before 11/1
TY0620: westerly waves during 11/1-5
TY0621: westerly waves after 11/16