# Use of QuikSCAT to explore the role of the Indian Ocean in the tropical Climate

C. Perigaud and S. Illig, OVW, July 2006

 Background about ocean/atmosphere coupling: interaction time scales (weather <-> climate)

2. Core of QuikSCAT proposal:

add to model winds forcing the IO component the QuikSCAT daily winds (relative to month mean)

---> impact on intraseasonal-to-interannual.

3. Impact on Pacific events.



#### **QOTI:** An Indian&Pacific oceans-atmosphere coupled model

#### QuikSCAT 2000-2006 Mean Zonal Wind Stress



Every year with Monsoon, strong meridional changes.

### Forced Pacific Models reproduce well ENSO





The 1997-1998 event needed WWBs to grow. On top of sudden WWBs, decadal changes continue their...

## Decadal recharge and WWB



It is how daily-to-decadal time scales are connected which determines whether a warm Pacific event grows or not.



QTCM simulates part of the QuikSCAT intraseasonal variability.















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Zhang and Perigaud, 2003a

Time series are averaged in the box in the central Indian Ocean.









#### 2-year long TOPEX along the equator in Pacific



Every winter, series of 3 to 4 MJOs coming from the Indian Ocean propagate to the Pacific.









What makes an El Nino grow or not in the combination of ...

...decadal charge ... and ... daily WWB index

MJO propagation from Indian Ocean to Pacific Ocean

Summer 2005 Winter 2005-2006 2 52 1.8 10 15 20 SEP FEB 1.6 1.4 1.2 ю 30 1 33 AUG 0.0 15 20 JAN 0.6 0.4 3 0.2 -2004 Jul ñ 30 53 -0.2 15 20 -0.4 DEC -0.6 10 NUL -0.8 2 -1 30 52 -1.2 180E 180e 40E 40E



Summer Monsoon and MJOs can also be associated to WWBs which trigger Pacific warm events or not, depending on the decadal recharge of the system.

#### Progress on exploring the Indian Ocean having a role in the climate.

1. Energy day-to-month: QuikSCAT: 54%, TRMM 82%, TOPEX 1%

- 2. Using [2-30]day energy QuikSCAT and TRMM improves intraseasonal SL (16% in 32-150 day)
- 3. Impact on SST and coupling (partial) under investigation Issues: climatology used for reference and spin up ===> Need continuity of QuikSCAT over > 10 years!

4. Data analysis: WWB-MJO origin in the Indian Atmosphere ---> possible impact of summer MJOs on ENSO: watch out 2007!...

