# 8D.3 ASSOCIATION OF GLOBAL WEATHER PATTERNS WITH INTRASEASONAL OCEANIC KELVIN WAVES COUPLED TO ATMOSPHERIC CONVECTION

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## 1. INTRODUCTION

It is widely recognized that 70-day Kelvin waves in the Pacific Ocean are frequently triggered by westerly wind bursts embedded within the active convective phase of the MJO. A few of these Kelvin waves occasionally develop and propagate eastward together with anomalies of deep convection and low-level westerly wind at less then 2 $ms^{-1}$. This pattern of coherence between the oceanic wave and the atmospheric convection suggests coupling between the oceanic waves and convection. A coupled event during July of 1997 is discussed by Roundy and Kiladis (2006).

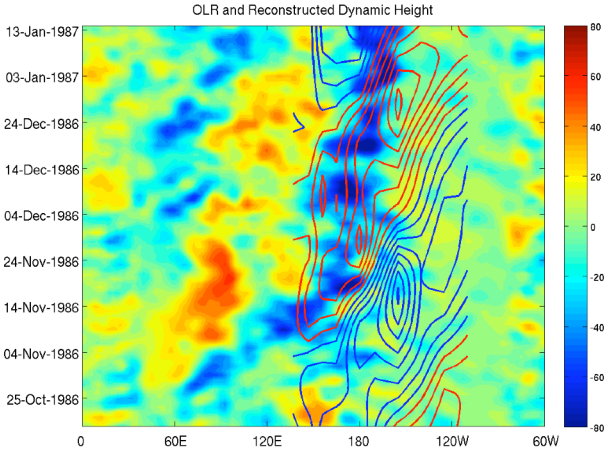


Figure 1: Example case of a coupled event during the northern hemisphere winter of 1986-1987. Outgoing longwave radiation anomalies are shaded, with cool colors indicating anomalously enhanced deep convection. Red contours indicate positive equatorial dynamic height anomalies reconstructed from the TAO buoy array and suggest a downwelling oceanic Kelvin wave.

Figure 1 shows an example event during October through January of 1986-1987. Convection begins early in November over the Indian Ocean, and moves eastward at 5-7 ms-1 toward the West Pacific, consistent with the MJO. This active convective phase is associated with low-level westerly winds (not shown), that amplify the oceanic Kelvin wave (red contours). As the Kelvin wave amplifies, the convection slows down and moves slowly eastward together with the wave, suggesting the coupled mode. The convective anomalies associated with the coupled event stand out above all other signals around the globe at the same time.

As with any other organized deep convection, this event was associated with large-scale overturning circulations and Rossby wave dispersion around the globe. We identified 19 similar events during northern hemisphere winter since 1974. A simple composite analysis based on the dates on which the Kelvin waves crested at the dateline reveals the patterns of the flow through the global atmosphere that are associated with these waves. This composite includes significant large anomalies in the global flow that extend to high latitudes. These high latitude anomalies are significantly larger than those that are linearly associated with the El Niño/Southern Oscillation (ENSO), and they evolve on timescales between those of the Madden Julian Oscillation and ENSO, potentially providing an opportunity for enhanced sub seasonal predictability in the flow of the global atmosphere.

The purpose of this presentation is to show this composite. This composite and further discussion is available from Roundy and Gribble, 2010.

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## 2. REFERENCES

Roundy, P. E., and L. Gribble-Verhagen, 2010: Variations in the flow of the global atmosphere associated with a composite convectively coupled oceanic Kelvin wave. *J. Climate*, In Press.

Roundy, P.E., and Kiladis, G. N. 2006: Observed relationships between oceanic Kelvin waves and atmospheric forcing. *J. Climate*, **19**, 5253-5272.