Press Releases

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Scientists advance weather forecasts by discovering the cause of unusual wind patterns

An international research team has made important steps towards improving weather forecasts, by proving they can predict unprecedented changes in the normal eastward or westward flow of air high up in the atmosphere, known as the quasi-biennial oscillation.

The quasi-biennial oscillation is one of the most repeatable wind patterns, but was unexpectedly seen to break down in February 2016. These winds are found high above the tropics in a part of the atmosphere known as the stratosphere, and their direction and strength provides forecasters with an indication of the weather to expect in Northern Europe. Westerly winds are known to increase the chance of warm and wet conditions, while easterlies bring drier and colder weather.

The disruption in the quasi-biennial oscillation two years ago was not predicted, not even one month ahead. However, using a climate model designed for the upper atmosphere, scientists have now found that the unusual wind disruption was caused by high altitude waves originating from outside the tropics. This discovery means forecasters will now be able to predict irregularities in the quasi-biennial oscillation several weeks in advance.

Dr. Wanatabe says, "*By developing more sophisticated models and by further exploring the mechanism of the QBO, including its interactions with tropospheric phenomena, we can be more confident in our seasonal forecasts and the likely impacts following extreme events such as was seen in 2016.*"

The study was carried out by Drs. Shingo Watanabe, Eriko Nishimoto and Yoshio Kawatani at the Japan Agency for Marine-Earth Science Technology (JAMSTEC: Asahiko Taira, President) in collaboration with Prof. Kevin Hamilton at the International Pacific Research Center (IPRC) of the University of Hawaii and Dr. Scott Osprey from the National Centre for Atmospheric Science based at the University of Oxford.

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Title: First Successful Hindcasts of the 2016 Disruption of the Stratospheric Quasi-biennial Oscillation

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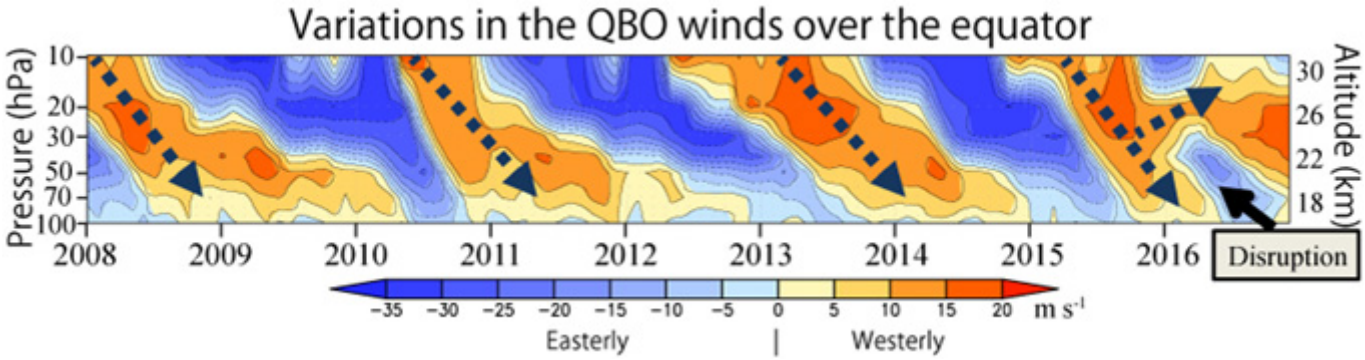

Figure 1: Diagram showing eastward (warm colours) and westward (cold colours) winds above the equator. The arrows at the right side of panel indicate the QBO disruption occurring in early 2016 while other arrows highlight three previous cycles of the normal QBO behavior.

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