

---

[JJ] Evening Poster | M (Multidisciplinary and Interdisciplinary) | M-IS Intersection

## [M-IS15]Geophysical fluid dynamics-Transfield approach to geoscience

convener:Keita Iga(Atmosphere and Ocean Research Institute, The University of Tokyo), Shigeo Yoshida(Department of Earth and Planetary Sciences, Faculty of Sciences, Kyushu University), Takatoshi Yanagisawa(海洋研究開発機構 地球深部ダイナミクス研究分野, 共同), Hidenori AIKI(Nagoya University)  
Sun. May 20, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

This session on geophysical fluid dynamics is open to discussions and researches on fluid phenomena in whatever fields of earth and planetary sciences, e.g., motions in the earth and planetary interior, oceans, atmospheres, volcanoes, and the ionosphere, conducted with whatever methods. Talks intending to stimulate exchange of ideas among multiple fields of researches or those identifying concepts that are commonly applicable to wide range of geophysical fluids are especially welcome.

---

## [MIS15-P03]The life-cycle analysis of wave energy in the global atmosphere and ocean for understanding the mechanism of tropical climate variations

\*Hidenori AIKI<sup>1,2</sup> (1.Institute for Space-Earth Environmental Research, Nagoya Univ., 2.Application Laboratory, JAMSTEC)

Keywords:tropical-extratropical interaction, mid-latitude Rossby wave, equatorial Rossby wave, mixed Rossby-gravity wave, El Nino / La Nina, Indian Ocean Dipole

For mid-latitude Rossby waves in the atmosphere, the expression for the energy flux for use in a model diagnosis, and without relying on a Fourier analysis or a ray theory, has previously been derived using quasi-geostrophic equations and is singular at the equator. Aiki et al. (2017, PEPS) have derived an exact universal expression for the energy flux which is able to indicate the direction of the group velocity of both equatorial and mid-latitude waves. This is achieved by introducing a streamfunction as given by the inversion equation of Ertel's potential vorticity, a novel aspect for considering the energy flux. The connection of the equatorial and coastal waveguides has been successfully illustrated by the energy flux of Aiki et al. (2017). This allows for tropical-extratropical interactions in oceanic and atmospheric model outputs to be diagnosed in terms of an energy cycle as shown in the present study.

<http://co2.hyarc.nagoya-u.ac.jp/labhp/member/aiki/>