

On field investigation of the kinetic  
fractionation factor in the isotope evaporation  
model.

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The Craig-Gordon model forms the basis for the calculation of isotopic composition of evaporation flux in ocean atmospheric isotope models. The non-equilibrium fractionation factor ( $k$ ) used in the model is under debate with different researchers suggesting different formulations of  $k$  instead of the classical parameterization introduced by Merlivat and Jouzel, 1979. A comparison is made between the observed and simulated deuterium excess values using the molecular diffusivity ratios suggested by Merlivat and Jouzel, (1979)(MJ), Cappa et al. (2003)(CD), Pfahl and Wernli (2009)(PW) in the tropical, subtropical and polar ocean environments. The water vapor samples were collected by cryogenic condensation method along the transect from Mauritius to the Prydz Bay ( $24^{\circ}$  S to  $69^{\circ}$  S and  $57^{\circ}$  E to  $76^{\circ}$  E) onboard the ocean research vessel SA Agulhas during the 9<sup>th</sup>(Jan-2017) and 10<sup>th</sup> (Dec-2017 to Jan 2018) Southern Ocean Expedition conducted by the National Centre for Antarctic and Ocean Research, Goa, India. The  $r^2$  between the observed and the simulated values of d-excess is 0.47, 0.47 and 0.49 for MJ, CD and PW respectively. The results suggest that the different parameterizations have a minor influence on the simulated d-excess values.

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