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Response of the Mozambique Channel transport to different wind stress fields

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We have investigated the effect of the shape and amplitude of the wind stress field on the transport through the Mozambique Channel using a barotropic shallow water model. For yearly averaged wind field the modeled transport equals that calculated with the linear island rule. However, for winds resembling those during the austral winter (i.e. July) non-linear regimes develop to the east of Madagascar's northern and southern tips, leading to a transport through the Channel significantly larger than that from the linear case. Analysis of the integral momentum balance shows that for high amplitude wind stresses both the inertial and forcing terms induce relatively large non-linear contributions to the Channel's transport.