

EGU22-5816, updated on 13 Aug 2022

<https://doi.org/10.5194/egusphere-egu22-5816>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



## The role of surface heat fluxes on development of warm seclusion favouring subtropical cyclone Raoni transition over the Southwestern Atlantic Ocean

**Michelle Reboita**<sup>1</sup>, Rosmeri da Rocha<sup>2</sup>, Natália Crespo<sup>2</sup>, Luiz Gozzo<sup>3</sup>, Maria Custódio<sup>3</sup>, Vinicius Lucyrio<sup>1</sup>, and Eduardo de Jesus<sup>2</sup>

<sup>1</sup>Instituto de Recursos Naturais, Universidade Federal de Itajubá, Itajubá, Brazil (mireboita@gmail.com)

<sup>2</sup>Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo, São Paulo, Brazil

<sup>3</sup>Universidade Estadual Paulista, Bauru, São Paulo, Brazil

In June 2021, an unusual cyclone developed near the boundary of Uruguay and southern Brazil. It initially had extratropical characteristics, later acquired features of a Shapiro-Keyser extratropical cyclone and then underwent a subtropical transition. When the subtropical system reached Brazilian water (1200 UTC 29 June 2021), the local Navy named the cyclone “Raoni”. The aim of this study is to describe the main drivers that made the cyclone develop features of a Shapiro-Keyser extratropical cyclone. Cyclogenesis was registered at 1800 UTC 26 June, forced by a trough at mid-upper levels that crossed the Andes and caused surface pressure deepening. Less than 24-hours later, the cyclone evolved following the Shapiro-Keyser development model, presenting a frontal T-bone pattern and warm seclusion. Sensitivity numerical experiments carried out with two regional models (Regional Climate Model - RegCM and Weather Research Forecasting Model - WRF) driven by ERA5 reanalysis indicate that the suppression of the surface sensible and latent heat fluxes produces a weaker extratropical cyclone without warm seclusion. Hence, surface heat fluxes seem to be the main driver to the warm seclusion development.