

EGU22-11343

<https://doi.org/10.5194/egusphere-egu22-11343>

EGU General Assembly 2022

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



Characteristics of a long-lived CIR and analytical modelling of the corresponding depression in the GCR flux

Mateja Dumbovic¹, Bojan Vrsnak¹, Bernd Heber², Manuela Temmer³, Patrick Kuhl², and Anamarija Kirin

¹University of Zagreb, Faculty of Geodesy, Hvar Observatory, Zagreb, Croatia (mdumbovic@geof.hr)

²Christian-Albrechts University in Kiel, Department of Extraterrestrial Physics

³University of Graz, Institute of Physics

We observe a long-lived CIR recurring in 27 consecutive Carrington rotations 2057-2083 in the time period from June 2007 - May 2009. We characterize the in situ measurements of this long-lived CIR as well as the corresponding depression in the GCR count observed by SOHO/EPHIN, and analyze them throughout different rotations. We find that the inverted GCR count time-profile correlates well with that of the flow speed throughout different rotations. We perform a statistical analysis and find the GCR count amplitude correlated to the peak in the magnetic field and flow speed, as expected based on previous statistical studies. In order to characterize a generic CIR profile for modelling purposes, we perform the superposed epoch analysis using relative values of the key parameters. Based on the observed properties we propose a simple analytical model starting from the basic Fokker-Planck equation. We employ a convection-diffusion GCR propagation model and apply it to the solar wind and interplanetary magnetic field properties observed for the analyzed long-lived CIR. Our analysis demonstrates a very good match of the model results and observations.