

Quality survey of Neutron Monitor data sources for 1951-2019

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Long-term measurements from the global neutron monitor (NM) network allow to study galactic cosmic ray (GCR) variations for the last seven decades. However, the network offers data of quite different quality from the many sources. Historically, NM data is distributed through different data repositories, which include the Neutron Monitor Database (NMDB), World Data Center for Cosmic Rays (WDCCR), The Pushkov Institute of Terrestrial Magnetism, Ionosphere and Radiowave Propagation (IZMIRAN) repositories and individual homepages of stations/teams.

Here we present a detailed quality survey by comparing the consistency of hourly resolution NM datasets of different origin. The analysis includes 300 datasets from 147 NMs in 1951-2019. As the main result of the survey, we found that the data of individual stations are not often uniform across the different sources. This results in problems with the reliability and reproducibility of scientific results. Our survey also underlines that special efforts should be given to a proper documentation of the datasets. This is particularly true for the oldest data that are in danger of getting lost to time. We also offer a list of currently recommended data sources for each station, based on their comparison with a “prime” dataset composed from long-lived NM stations that fulfil specific quality criteria.

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