

## Cosmic ray observation at Syowa station in the Antarctic -- current status and near future plan --

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On February 2018, we started cosmic ray observation at Syowa station in the Antarctic. What is unique about this observation is that it is simultaneous observation of NM (Neutron Monitor) and MD (Muon Detector). It is important to analyze NM and MD data together to study space weather events, such as Forbush Decreases (FDs). We work on the integrated analysis and have reported first case result (Munakata et al., 2022). We are trying to improve the analysis method and expecting Syowa NM and MD data will provide important information. Syowa data are also used to study environmental effect on cosmic ray count rate (Kataoka et al., 2022).

Although there have been a few troubles on computer system, observation is performed stably. Figure 1 shows time variation of NM and V directional channel of MD count rate at Syowa. The duty cycles of NM and MD are 89% and 97%, respectively. Data are accumulating and published on a web page at

<http://polaris.nipr.ac.jp/~cosmicrays/>

and as archived files at

<http://cosray.shinshu-u.ac.jp/crest/>

It was originally planned to install two sets of NM and MD in two containers, but due to various circumstances one set was installed. Installation plan is now underway with completion scheduled for 2025.

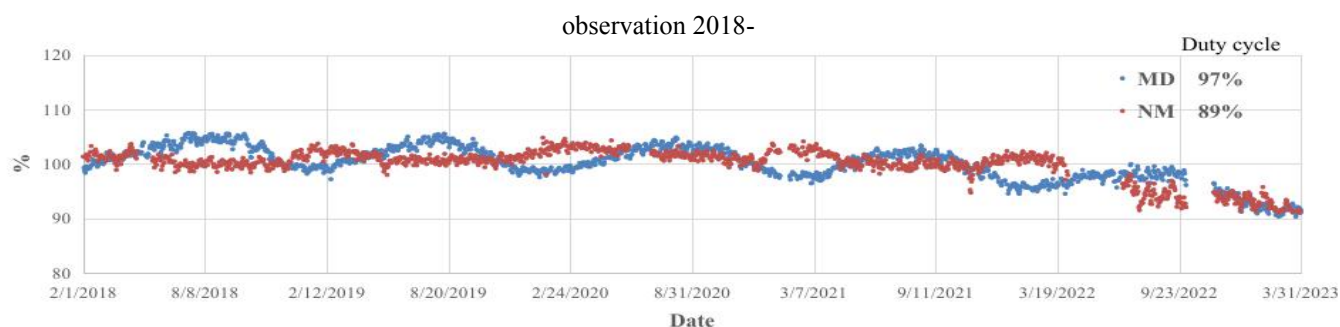


Figure 1. Time variation of Syowa NM and MD(V directional channel) since 2018.2.

### References

Munakata, K., Kozai, M., Kato, C. et al. Large-amplitude Bidirectional Anisotropy of Cosmic-Ray Intensity Observed with Worldwide Networks of Ground-based Neutron Monitors and Muon Detectors in 2021 November. *Astrophys. J.*, 938, 30 (2022). <https://doi.org/10.3847/1538-4357/ac91c5>

Kataoka, R., T. Sato, C. Kato, et al. Local environmental effects on cosmic ray observations at Syowa Station in the Antarctic: PARMA-based snow cover correction for neutrons and machine learning approach for neutrons and muons, *J. Space Weather Space Clim.*, Volume 12, 37 (2022) <https://doi.org/10.1051/swsc/2022033>