## A trial product of daily precipitation (GPC/m: Global Precipitation

## Climatology by Machine Learning)

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## 要旨

This paper presents a new precipitation dataset that is daily, has a spatial resolution of one degree on a quasi-global scale, and spans more than 42 years, using machine learning techniques. The ultimate goal of this dataset is to provide a homogeneous daily precipitation dataset for several decades without gaps, which is suitable for climate analysis. As a first step, 42 years of daily precipitation data was generated using machine learning techniques. The machine learning methods are supervised learning, and the reference data are estimated precipitation datasets from 2001 to 2020. The three machine learning methods are random forest, gradient-boosted decision trees, and convolutional neural networks. The input data are satellite observations and atmospheric circulations from reanalysis, which are somewhat modified based on knowledge of the climatological background. Using the trained statistical models, we predict back to 1979, when daily precipitation data was almost unavailable globally. The detailed procedures are described in this paper. The produced data have been partially evaluated. However, additional evaluations from different perspectives are needed. The advantages and disadvantages of this precipitation dataset are also discussed. Currently, this GPC/m precipitation dataset version is GPC/m-v1-2024.

Takahashi, H.G. (2024). GPC/m: Global Precipitation Climatology by Machine Learning; Quasi-global, Daily, and One Degree Spatial Resolution. https://doi.org/10.48550/arXiv.2409.09639

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