M18a　南極ドームふじアイスコア中の硝酸イオン濃度に埋もれた太陽11年、22年、約90年活動周期の発見

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Ice cores are known to yield information about past astronomical phenomena as well as information about past climate. We report time series analyses of annually resolved nitrate concentration variations in an ice core drilled at the Dome Fuji station in East Antarctica, corresponding to the period from CE 1610 to 1904, in which the period of our obtained nitrate data and that of the observed sunspot numbers overlap. Our analyses revealed clear evidence of 11-, 22-, and 90-year periodicities in the ice core data, comparable to the respective periodicities of the well-known Schwabe, Hale, and Gleissberg solar cycles. These results show for the first time that ice core nitrate concentrations can be used as a proxy for past solar activity on decadal to multidecadal time scales. We also point out that the 11-year and 22-year periodicities are detected in nitrate concentrations even during the Maunder Minimum (1645–1715), supporting the cyclic behavior of the solar dynamo during the grand minimum.

In this talk, we will present the above result and discuss the mechanism behind.