

## Verifying footprints of solar cycles and supernovae in polar ice cores

Polar ice cores can yield information about astronomical phenomena as well as information about climate changes of the past. More than 40 years ago, Rood and his colleagues suggested a possibility that such a polar ice core preserved footprints of historical supernovae and solar cycles (Rood et al., Nature, 1979). In the Rood's work, the signatures of three historical supernovae were identified as "spikes" found in the depth profile of nitrate ion concentrations. This was a preliminary result, however, as the authors themselves mentioned in the literature, and was followed by criticism based on analyses from several other ice cores in traditional glaciology. The group finally withdrew their original hypothesis in 1983 as contamination with analysis of their second ice core. The report of detection of nuclear gamma-rays associated with  $^{44}\text{Ti}$  decays from the young supernova remnant Vela Jr. (RX J0852.0-4622) shed light again on the Rood's work. This was because the third "unknown" spike out of four identified spikes in the Rood's paper was suggested to correspond to a footprint of the supernova explosion of the newly detected Vela Jr. remnant (and, also the withdrawal was not well known in our field of astronomy). I will review this following line of work in glaciology, and why nitrate observations in ice cores are difficult. I will also present our new result of chemical analyses in Dome Fuji ice cores (Antarctica) which clearly show solar cycles and will discuss its meaning as a touchstone to detect supernova candidate spikes as well as spike structures we observed simultaneously. Perspectives to access the supernova rate in the Milky Way will also be mentioned.

### Length of presentation requested

Oral presentation: 25 min + 5 min questions (Review-type talk)

### Please select between one and three keywords related to your abstract

Stellar explosions and mergers - observations

### 2nd keyword (optional)

### 3rd keyword (optional)

**Primary author:** MOTIZUKI, Yuko (RIKEN)

**Presenter:** MOTIZUKI, Yuko (RIKEN)