

Comments

After the first revision the paper has considerably improved but need more explanation before it could be accepted for publication in the journal. Some specific points have been listed below:

Still for the sampling which I am confused. The author collected “ice samples” (is it ice core?), I am not sure the authors mean supraglacial ice, granular ice or snowpits (which depends on where ice core retrieved, above ELA or ablation zone)? As in the supplementary information, depth of ice sample is more than 50 cm. For a snow pit, it is easy to dig out with 50 cm depth, but ice, you have to drill down to 50 cm depth manually. As my experience, drilling down to get an ice core of 50cm depth is quite hard work manually. Please clarify.

In the supplementary Table S1, for examples, in the regions 1 Qiyi glacier, are the sites from 1 to 19 located at the same latitude and longitude? The author only showed one latitude and longitude coordinates.

Page 6 line 4, “Then each ice sample was cut vertically into small pieces from the surface to the bottom”. This sentence is confused. Each ice sample means each ice core? The resolution of each pieces is not the same as shown in Table S1. Especially for the surface sample. Why you choose the surface layer is 22 cm for site 10, and 12.5cm for site 13?

WSOC measurements: In the previous studies of WSOC from the glaciers, precipitation and river waters in the Tibetan Plateau, e.g., Li Xiangying et al. (2018), Hu Zhaofu et al. (20187), Liu Yanmei et al. (2016), Li Chaoliu et al. (2018), Qu Bin et al. (2017), the concentrations of WSOC is much lower than the data the author measured. What kind of bottles (or vials) did the authors use to collect ice samples in this study? Any pretreatment? Any blanks of WSOC measurements? When the author cut the ice pieces, any pretreatment to shaving the outer layer (avoiding contamination) where contacted with the plastic bags? Dose the author mean the pretreatment as same as that for ice core? Any explanation for the very higher WSOC concentrations in this study?

The author mentioned “10 ml refers to the amount of sample solution after filtration that used to measure the WSOC concentration,” what kind of filters used to filter the WSOC samples?

For Fe analysis, dose the author use the bulk sample or the filtered sample? How many days you used for acidifying the samples?

In the response to Reviewer 2, the author declared that “we referred to attribute the major industrial pollution and biomass burning sources to the anthropogenic emission sources.” As an important biomass burning, how does the author to eliminate the impact of forest fire (natural source)?

For the MD data (average concentration is 241 ± 452 ng g⁻¹ on TP glaciers in the abstract) in this study, I can't see the Al concentrations, but I think the unit should be ppm rather than ppb as compared with previous studies from glaciers in the Tibetan Plateau. Al concentrations may be much higher than that of Fe in glaciers, thus calculation should be larger the current data.

In the conclusion, “The lower absorption Ångström exponent ($\text{\AA}_{\text{tot}} < 2$) suggested that the sites 30, 51, and 56-58, 65 were primarily influenced by fossil fuel emission, whereas the rest of the sites were heavily influenced by mineral dust and biomass burning.” Sites 30, 5a, and 56-58, 65, were corresponding to which glacier and which season? Why for the same glacier, the influence of fossil fuel emission, mineral dust and biomass burning are difference? Any reasons? In the conclusion, I prefer to see the clear summary of region rather than different sites.