EGU General Assembly 2022

The Changbaishan Millennium eruption tephra recorded in the Yueliangwan peatland, northeast China

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Report Outline

- Regional setting and materials
- Results and discussions
- Conclusions

1. Regional setting and materials

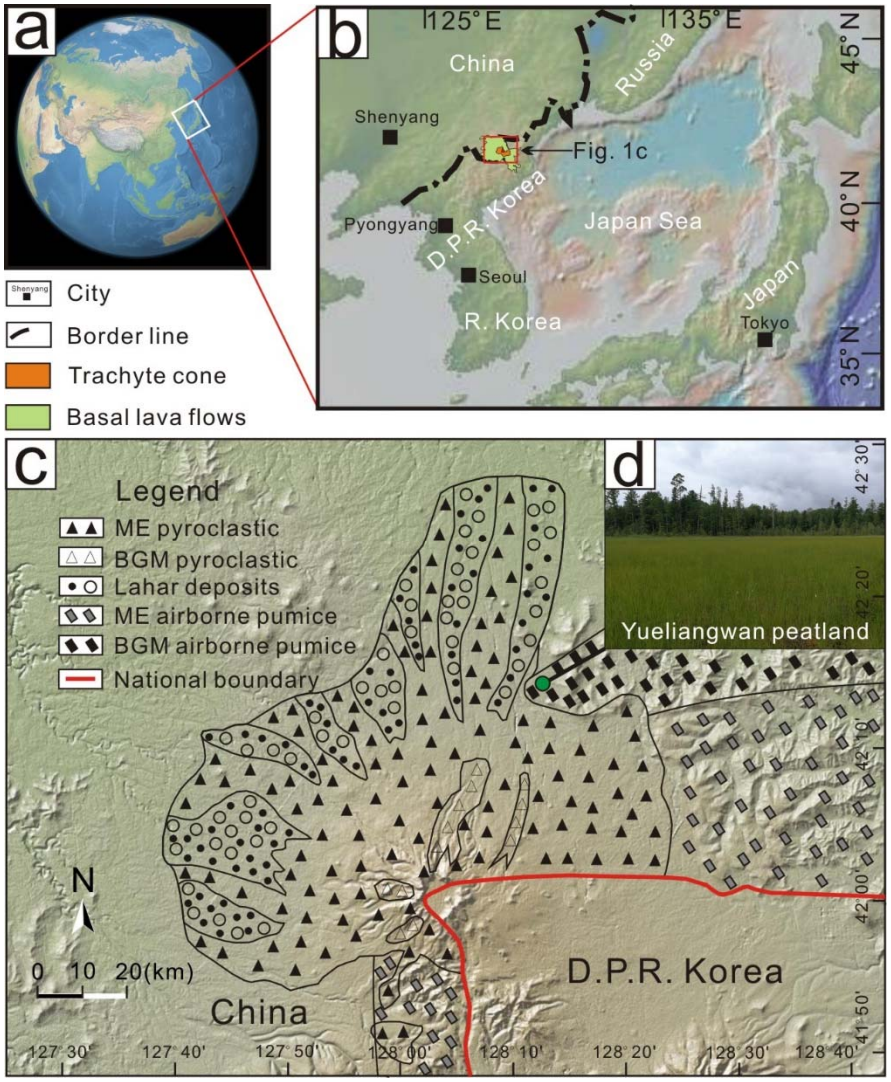


Figure 1. (a)-(b) Location of Changbaishan volcanic field; (c) Distribution of pyroclastic deposits, lahar deposits and airborne pumice produced by the ME event; (d) Landscape of the Yueliangwan peatland.

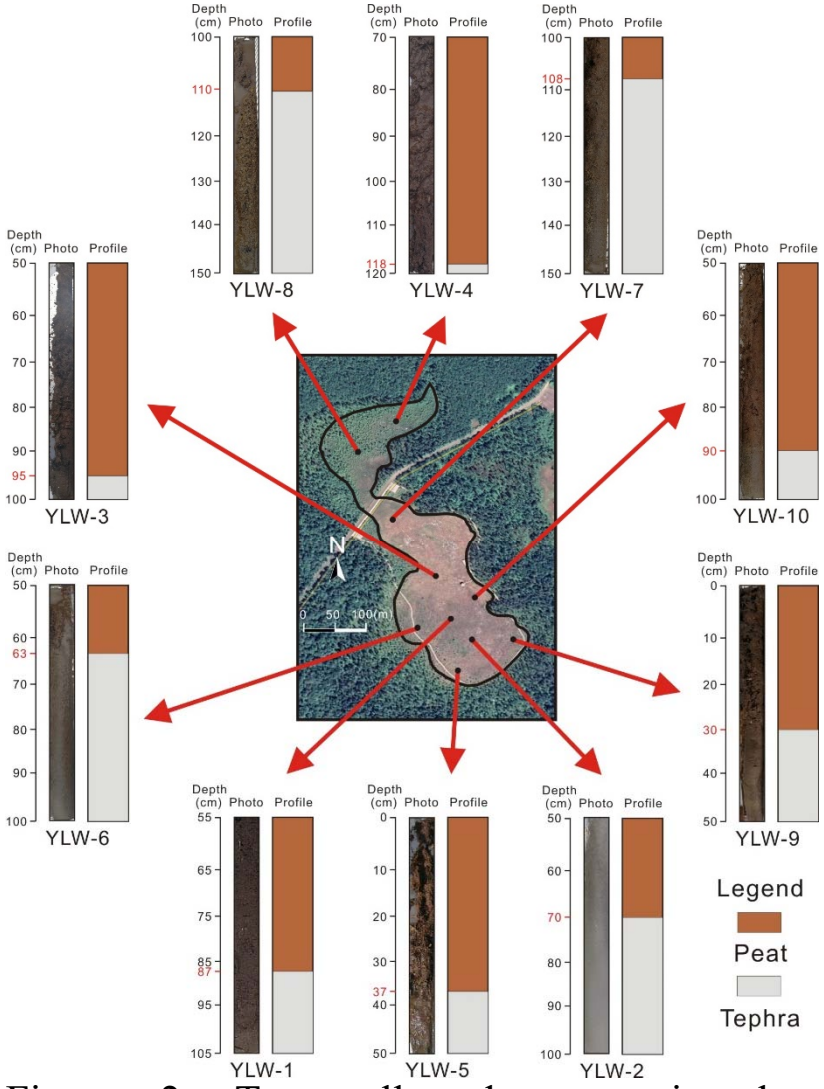


Figure 2. Ten collected cores in the Yueliangwan peatland showing the peat and tephra sequence of each core.

2. Results and discussions

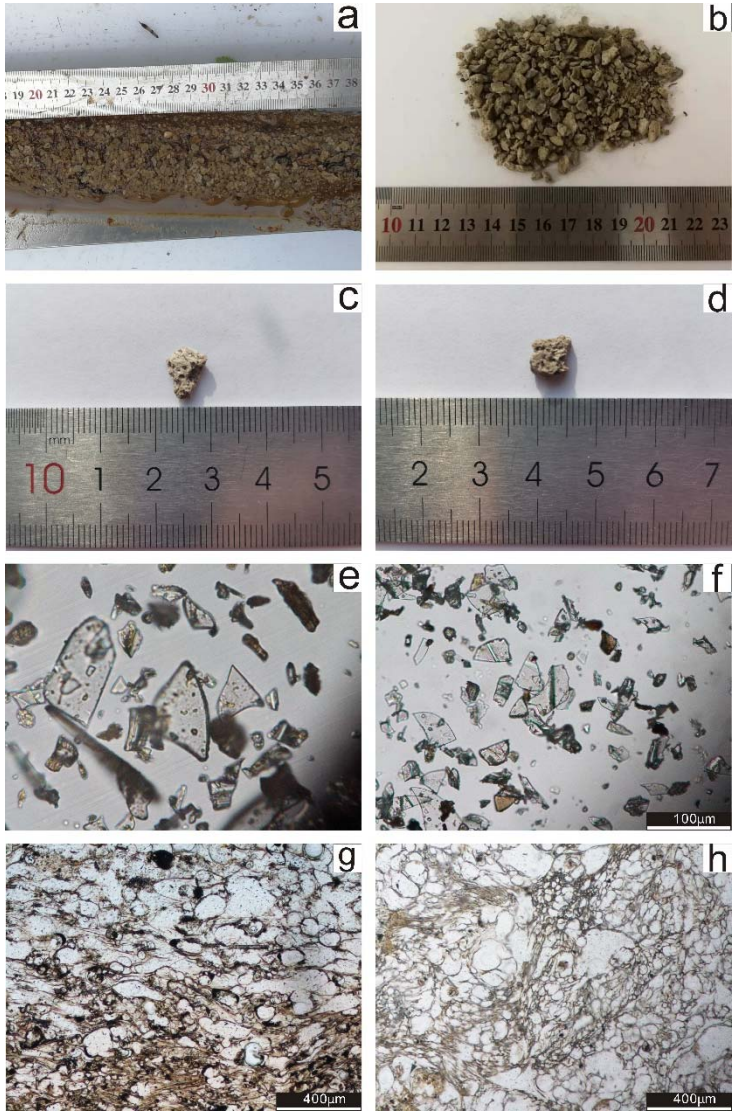


Figure 3. Macro and micro-features of the buried tephra in cores of the Yueliangwan peatland.

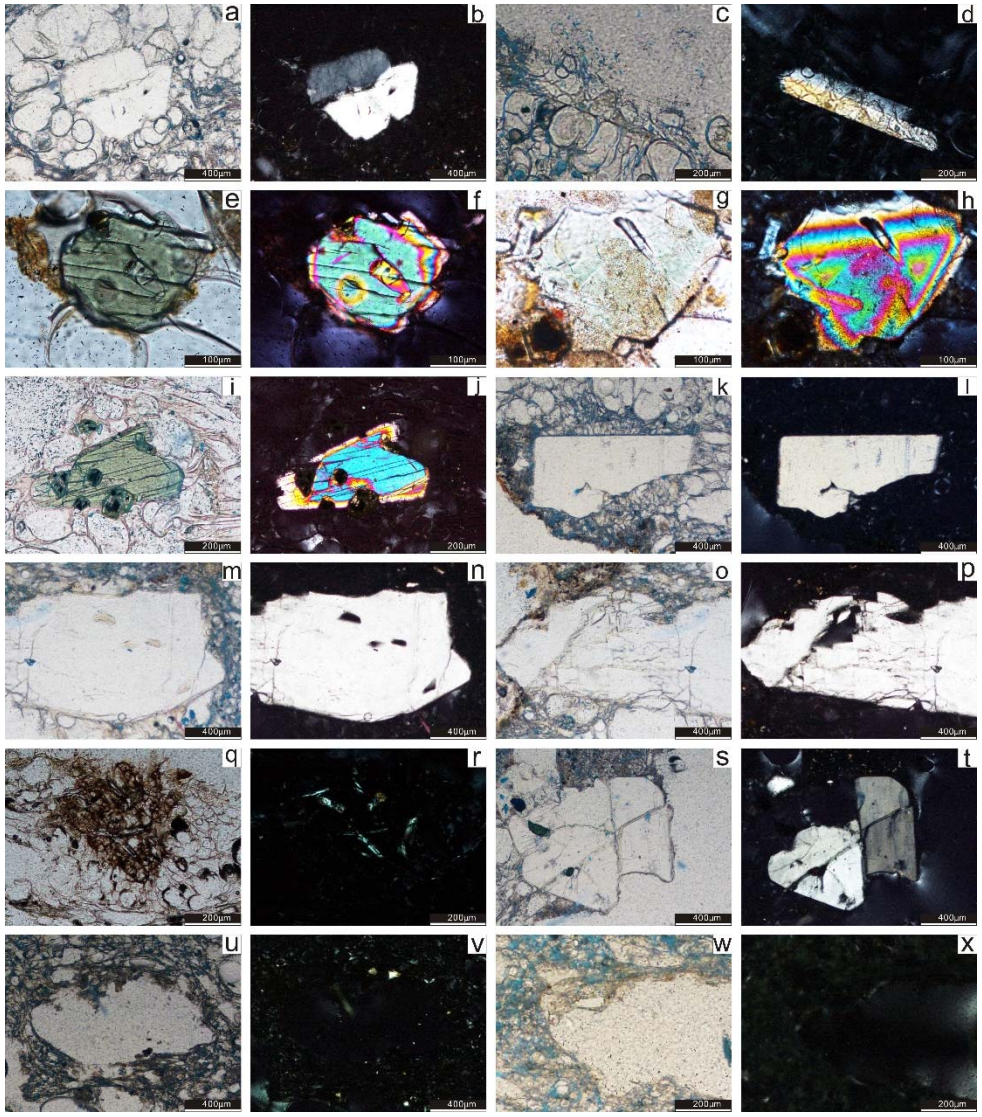


Figure 4. Representative minerals of the buried tephra in the Yueliangwan peatland.

2. Results and discussions

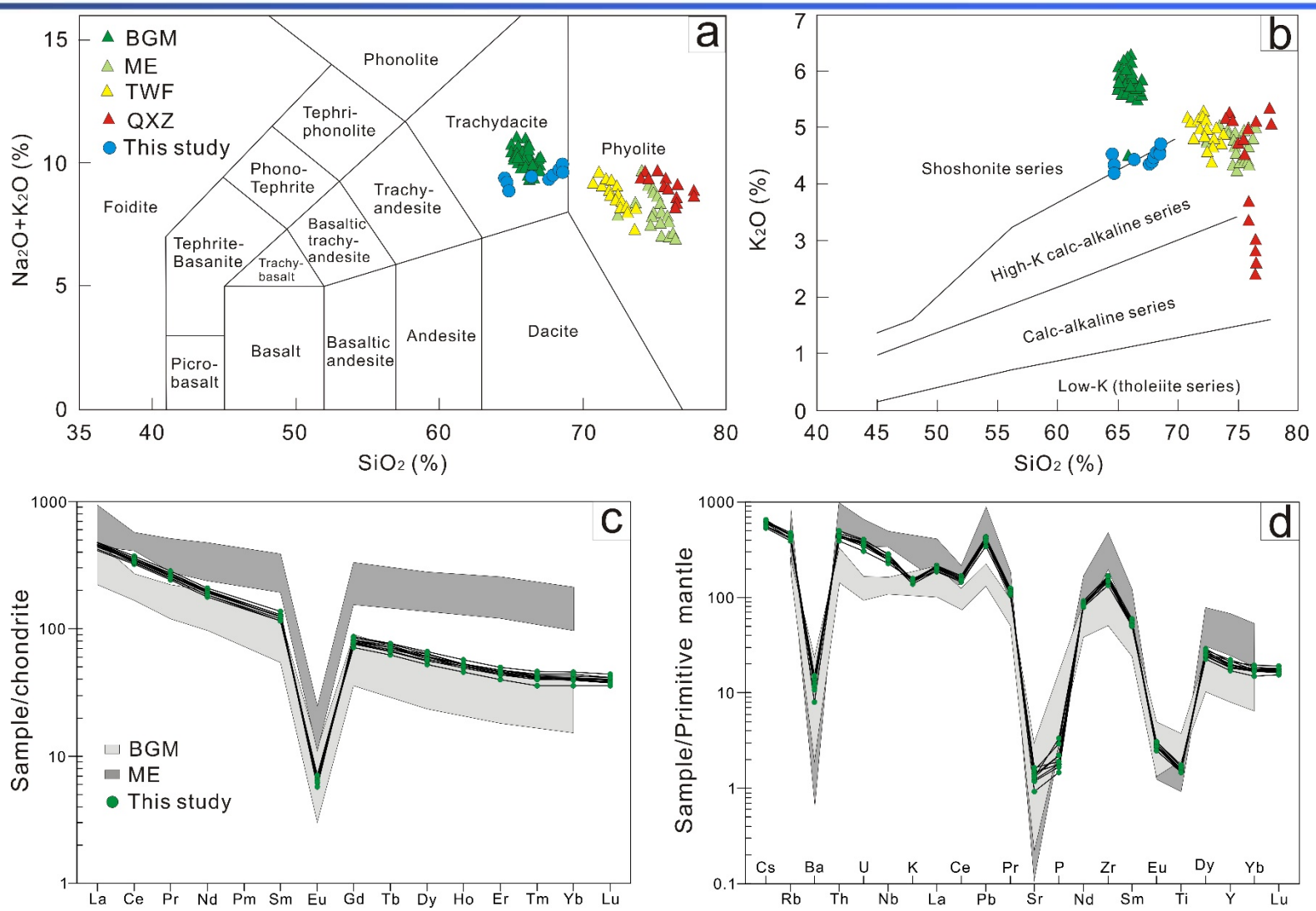


Figure 5. (a) Total alkali silica (TAS) diagram (Le Bas et al., 1986); (b) Plot of SiO2-K2O (Peccerillo and Taylor, 1976); (c) Chondrite-normalized rare earth element patterns (normalization values from Boynton, 1984); (d) Primitive-mantle-normalized trace element spidergrams (normalization values from Sun and McDonough, 1989).

2. Results and discussions

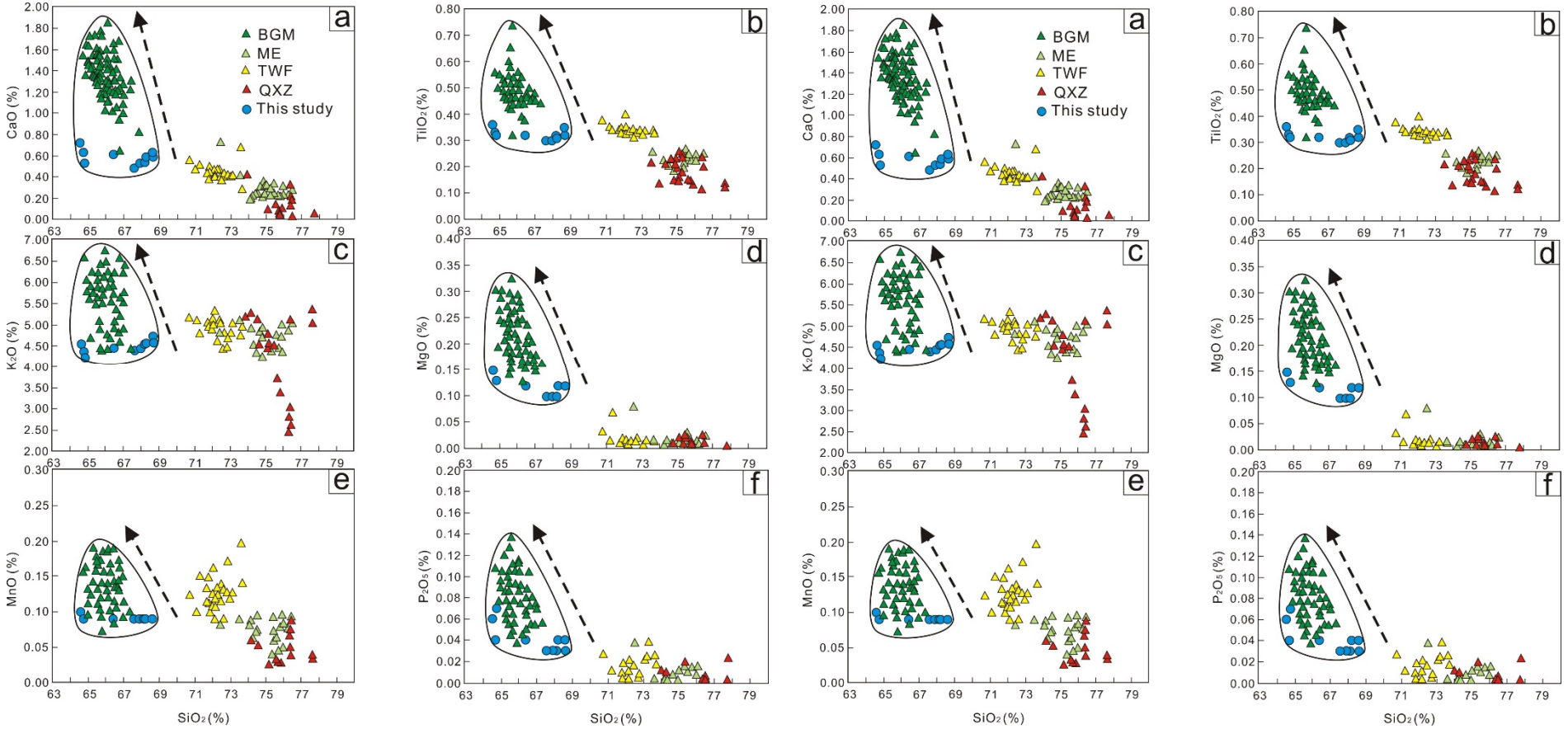


Figure 6. (a) Plots of major elements of volcanic glass in wt. % (major elements of the BGM, ME, TWF and QXZ events are cited from Pan et al., 2020).

Figure 7. (a) Plots of trace elements and rare earth elements of volcanic glass in ppm (trace elements and rare earth elements of the BGM, ME, TWF and QXZ events are cited from Pan et al., 2020).

2. Results and discussions

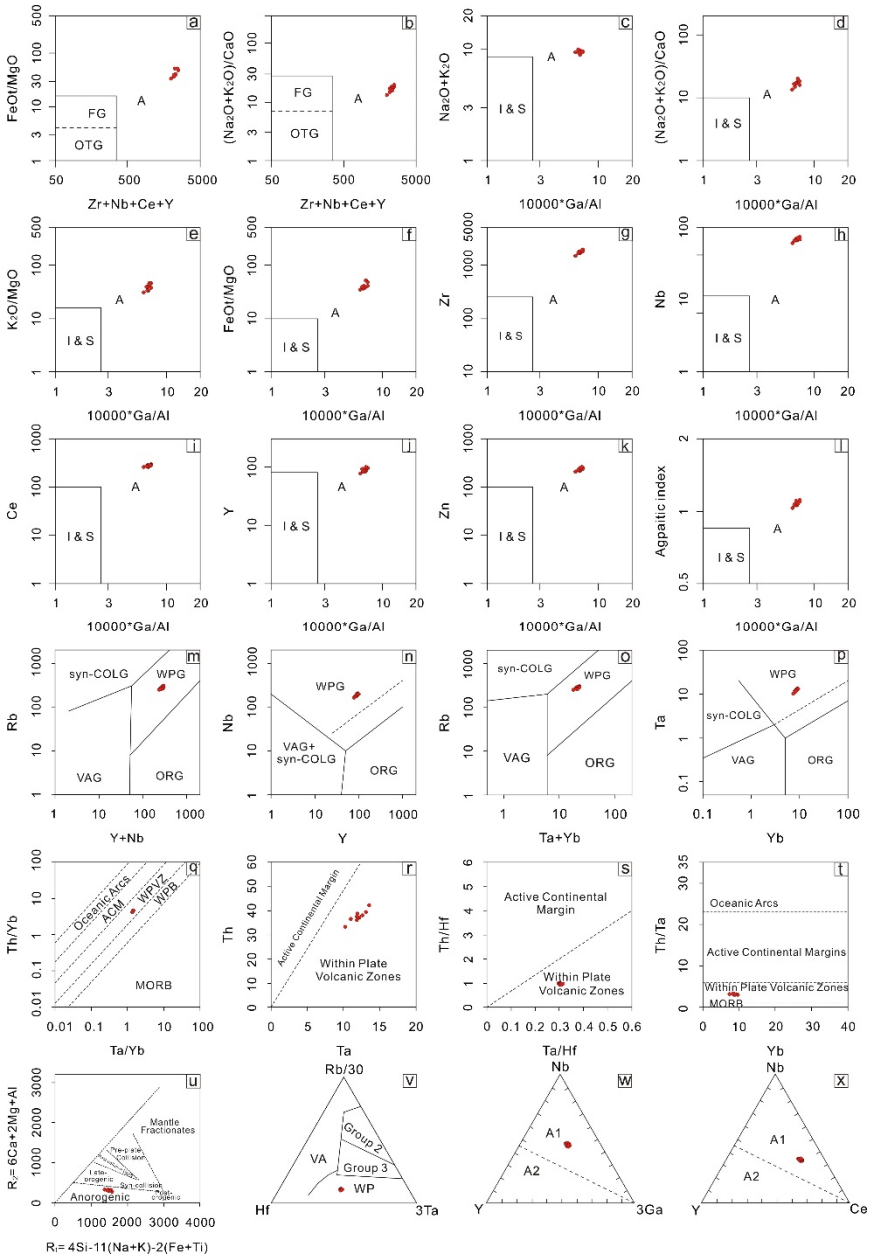


Figure 8. (a)-(l) Discrimination diagrams of genetic types (Whalen et al., 1987); (m)-(p) Granite tectonic discrimination (Pearce et al., 1984); (q)-(t) Geotectonic classification of volcanic rocks (Schandl and Gorton, 2002); (u) Geotectonic classification of volcanic rocks (Batchelor and Bowden, 1985); (v) Hf-Rb/30-3Ta discrimination (Harris et al., 1986); (w)-(x) Nb-Y-Ce and Nb-Y-3Ga diagrams (Eby, 1992).

The Changbaishan Tianchi volcano fields belong to the anorogenic within plate back-arc extensional tectonic environments.

2. Results and discussions

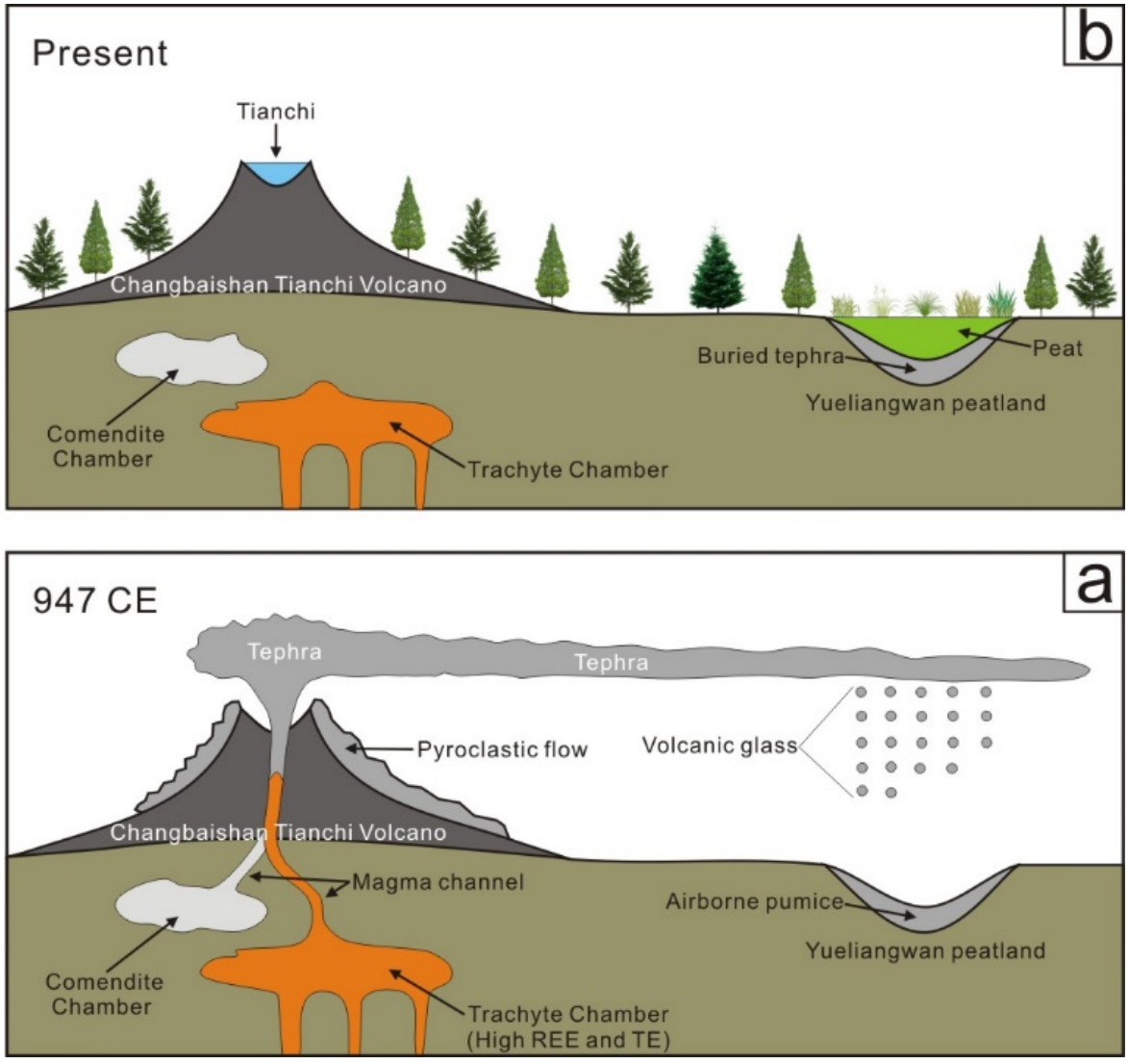


Figure 9. (a) The eruptive and sedimentary processes of buried tephra in the Yueliangwan peatland; (b) Present status of Changbaishan Tianchi volcano and Yueliangwan peatland.

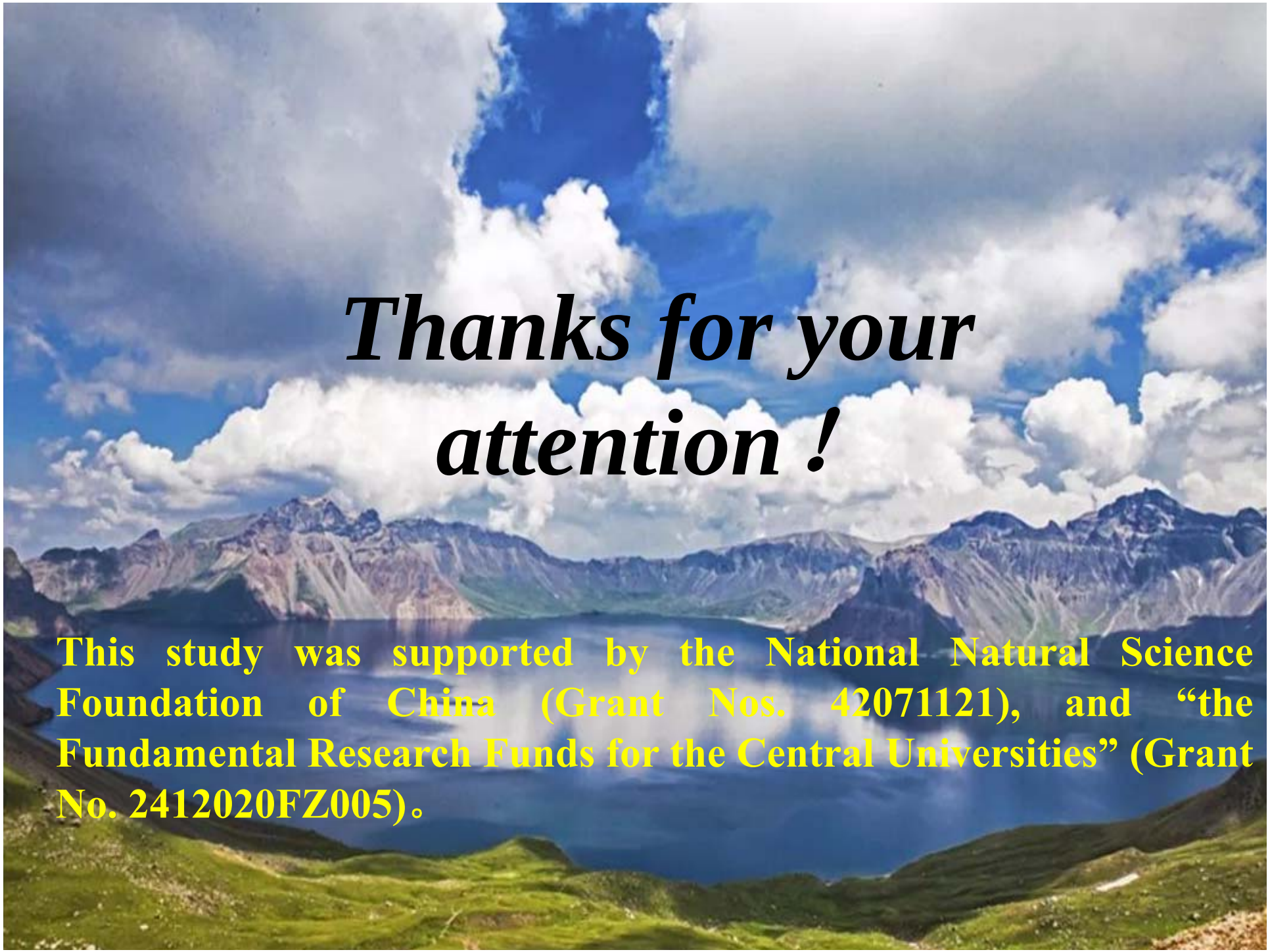
A large amount of volcanic glasses formed through the eruption of trachyte magma that had high contents of rare earth elements (REE) and trace elements (TE). Then, fine grained volcanic glasses were sprayed into the atmosphere and transported to the Yueliangwan areas. The volcanic glasses deposited and formed airborne pumice layer.

3. Conclusions

(1) The buried tephra under the Yueliangwan peatland was the product of Changbaishan Millennium eruption, which belongs to the trachyte eruption.
(2) The tectonic background analyses reveal that Changbaishan Tianchi volcano fields belong to the anorogenic within plate back-arc extensional tectonic environments.
(3) Eruptive and sedimentary processes of the buried tephra were postulated as follows: a large amount of volcanic glasses formed through the eruption of trachyte magma that had high contents of rare earth elements (REE) and trace elements (TE). Then, fine grained volcanic glasses were sprayed into the atmosphere and transported to the Yueliangwan areas. The volcanic glasses deposited and formed airborne pumice layer.

The above contents have been published on *Catena*. More information can be got from the following reference.

Zhang, M.M.,* Bu, Z.J., Wang, X.A., Chen, J, Cui, Y.X. 2022. Petrochemical characteristics and geological significance of the tephra buried under peat deposits: Constrains on the Changbaishan Millennium eruption. Catena. 209, 105857.


Thanks for your attention !
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