Blue Mountains Province – why study it?

The extent and timing of translation and or creation of alluvial fans terraces, including the Blue Mountains (BM) before, during and or after their bounding fault migration path along the arc-continent boundary is still a matter of debate.

Despite the results from Wilson & Cox (1988) and others, which are consistent with CW rotation, paleomagnetic results from the plate may be incorrect due to lack of paleohorizontal (it is possible) and also there are other complicating factors such as cooling and magnetization during differential uplift.

Therefore, understanding the origin of magnetic minerals and thermal history of plutons are important.

Wallowa batholith and its relationship with the rest of Blue Mt. units

Wallowa batholith is closer to SHIZ than previous studies, and might have more competing paleomagnetic evidence of this rotation.

We studied the youngest pluton, Craig Mtn, because it seemed most likely to have the simplest history.

Why different results from neighboring sites in the same pluton?

Are the two “useful” sites different in magnetic mineralogy or alteration history that allowed their remanence to survive?

Obscure Google earth view of Craig Mtn pluton and surrounding units

Wallowa terrane is closer to SHIZ than previous studies, and might have more competing paleomagnetic evidence of this rotation.

Conclusions

- Useful (well resolved) site mean directions are down to the NE, with significantly different inclinations, perhaps due to pluton tilting.
- Low Temperature Demagnetization (LTD), Day plot, and thermomagnetic susceptibility curves indicate that the main remanence carrier is multidomain magnetite.
- We did not find any differences in magnetic mineralogy or evidence of alteration that would account for preservation of an original magnetization in just the two useful sites or natural demagnetization in the useless sites.

Remaining Questions:

- If there is no difference except remanence, could mechanism be local magnetization or remagnetization not retention?
- Local magnetization?
- Possible remagnetization of useful sites by younger igneous events, but no CRD flows have similar directions.
- Possible alteration of finest-grained magnetic phase from local fluids(?) but no effect on bulk mineralogy(?)
- Post-collection remagnetization?
- Samples were shipped across the Atlantic twice and studied in Europe, so their exposure to high magnetic fields is unknown.

ROCK-MAGNETIC STUDY OF THE WALLOWA BATHOLITH

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Rock-Magnetic Study of the Wallowa Batholith

Zak et al. (2012; 2015).

We used specimens from two localities: SW of Ft. Klamath (KV 145-2-1, 146-4-3) and Saddle Mtn (KV 148-4-5).

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