Age and origin of Sn mineralization in the Eastern Erzgebirge (Germany and Czech Republic)

Guilcher M.[1], Burisch M.[1,2], Leopardi D.[1], Albert R. [3], Gerdes A.[3], Cerny J.[1], Thiele S.[1], Gutzmer J.[1]

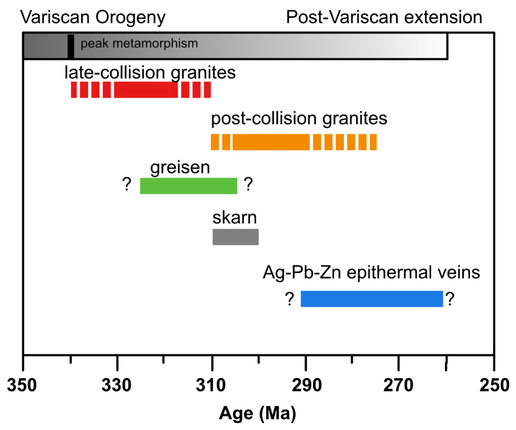
[1]Helmholtz-Zentrum Dresden-Rossendorf, Helmholtz Institute Freiberg for Resource Technology, Chemnitzer Straße 40, 09599 Freiberg, Germany
[2]Mineral Systems Analysis Group, Department of Geology and Geological Engineering, Colorado School of Mines, 1516 Illinois Street, Golden, CO, 80401, USA
[3]Goethe University Frankfurt, Frankfurt Isotope and Element Research Center (FIERCE), Altenhöferallee 1, 60438 Frankfurt am Main, Germany

HELMHOLTZ ZENTRUM DRESDEN ROSSENDORF

HELMHOLTZ INSTITUTE FREIBERG FOR RESOURCE TECHNOLOGY

Motivation

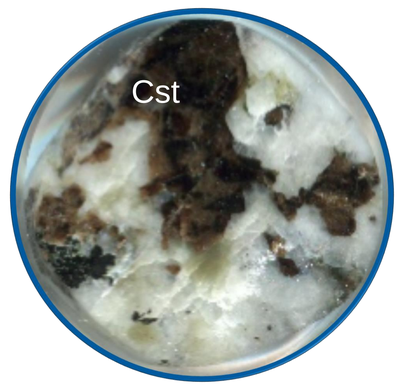
- Intrusion-related world class Sn-W-Li systems
- Sn mining between the 15th and 20th Century
- Potential resources for Sn, Li, W
- Unclear age of mineralization for Sn greisen stockworks and veins
- Multiple episodes of greisenisation?
- Temporal association with district-scale Ag-Pb-Zn epithermal systems



Modified after Reinhardt et al. (2022), Meyer et al. (2023)

Material & method

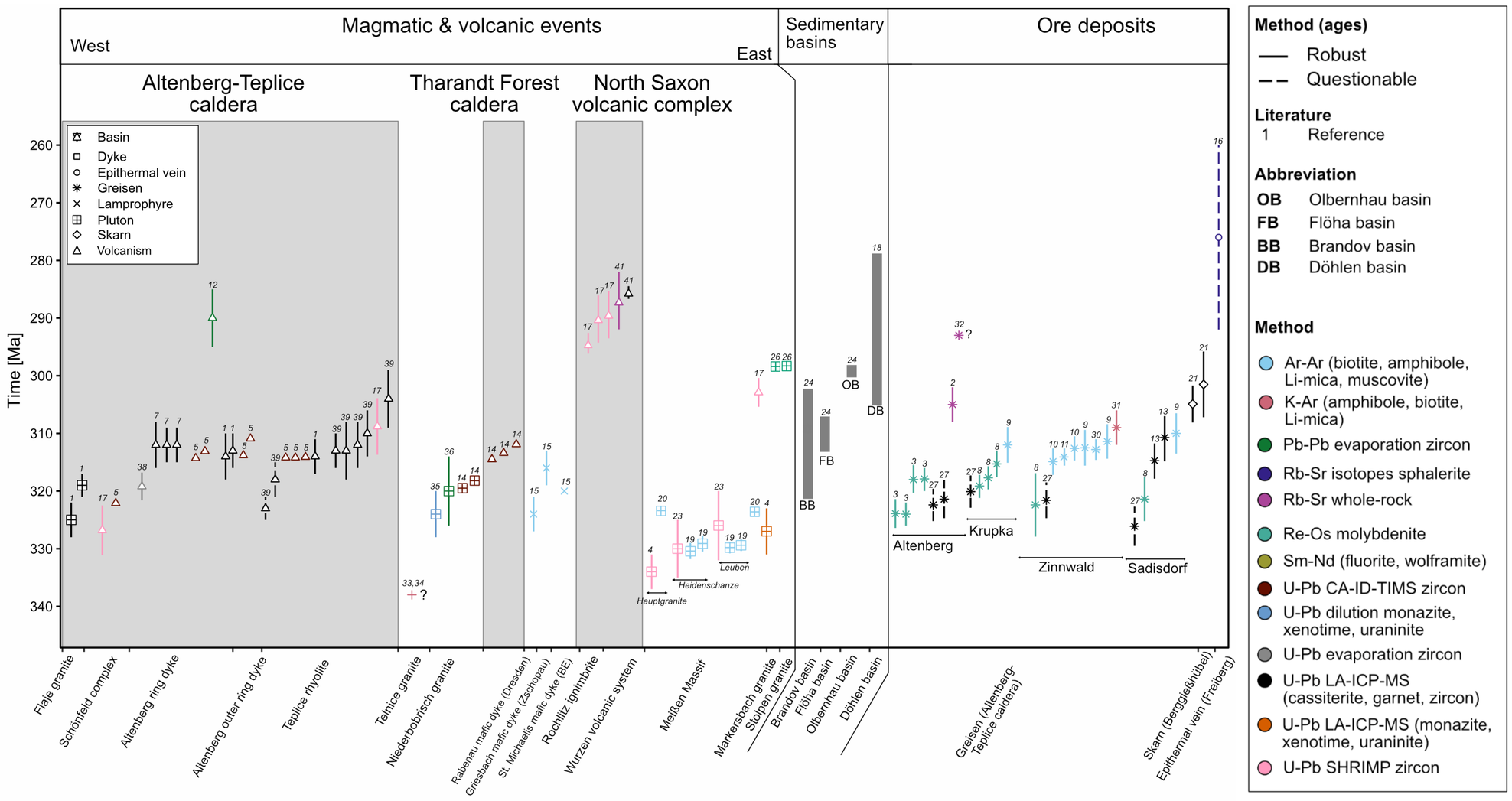
- U-Pb LA-ICP-MS on cassiterite
- Round mounts
- Sn-(±Li, W, Cu, Mo) greisen stockworks and quartz-cassiterite veins
- FIERCE lab., Goethe University, Frankfurt am Main



Round mount (diameter: 25 mm).
Abbreviation: Cst = cassiterite

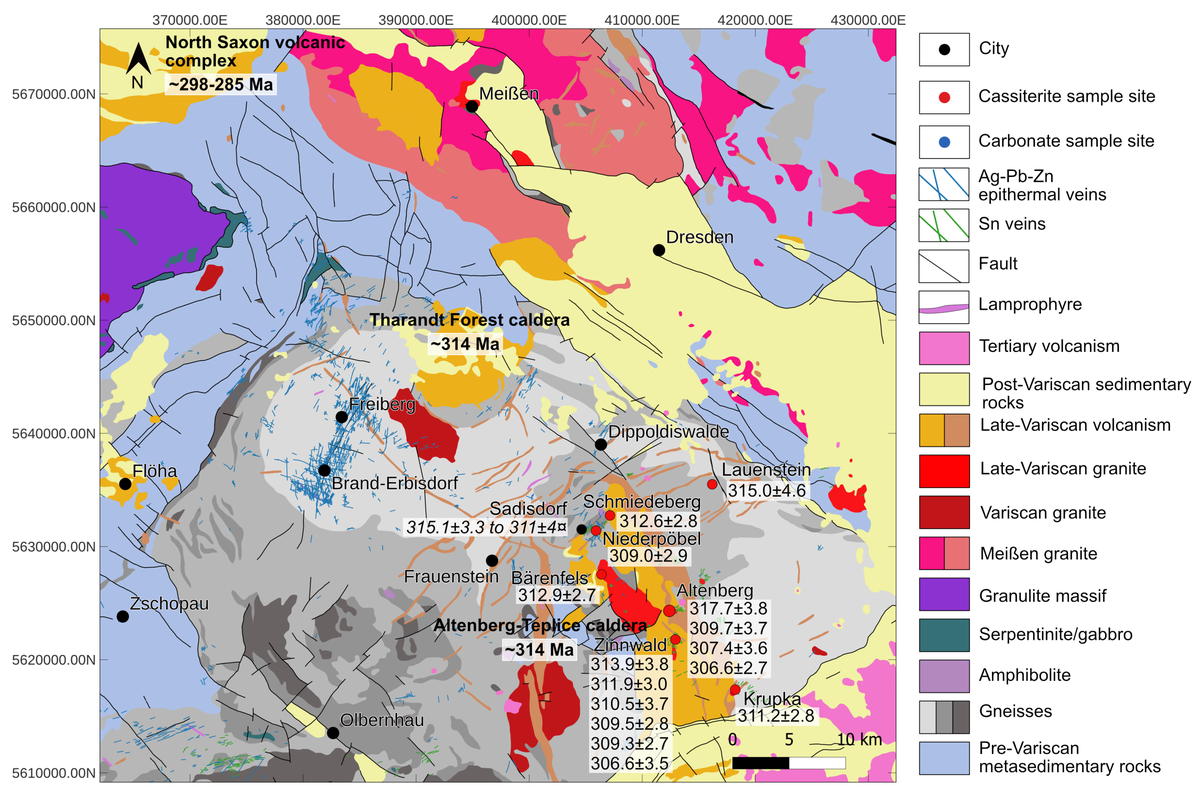
Geochronology – current understanding

- First episode of felsic magmatism: 330-320 Ma
- Rhyolitic flows, tuffs and ring dykes: 315-310 Ma → formation of the Altenberg-Teplice and Tharandt Forest calderas
- Only the Altenberg-Teplice caldera is associated with Sn mineralization
- Scattered or contradictory ages for Sn deposits



Simplified compilation of ages of granite intrusion, volcanic rocks, sedimentary basin formation and Sn greisen deposits in the eastern part of the Erzgebirge metallogenic province. References:1. Tomek et al. (2021), 2. Gerstenberger et al. (1989), 3. Romer et al. (2007), 4. Hofmann et al. (2009), 5. Tichomirowa et al. (2022), 7. Tomek et al. (2019), 8. Akerman et al. (2017), 9. Seifert et al. (2016), 10. Seifert et al. (2011), 11. Atanasova et al. (2012), 12. Kempe et al. (1999), 13. Leopardi et al. (under review), 14. Breitkreuz et al. (2021), 15. Von Seckendorff et al. (2004), 16. Ostendorf et al. (2019), 17. Hoffmann et al. (2013), 18. Zieger et al. (2019), 19. Wenzel et al. (1997), 20. Sharp et al. (1997) in Müller (2011), 21. Burisch et al. (2019), 23. Nasdala et al. (1999), 24. Löcse et al. (2019), 26. Käßner et al. (2021), 27. Zhang et al. (2017), 30. Neßler et al. (2016), 31. Dolejš and Štemprok (2001), 32. Haack (1990), 33. Štemprok et al. (2003), 34. Klomínský et al. (2010), 35. Förster et al. (1998), 36. Tichomirowa (1997), 38. Romer et al. (2010), 39. Casas-Garcia et al. (2019), 41. Wendt et al. (1995).

Preliminary results



Cassiterite ages from Sn deposits in the eastern Erzgebirge (this study, ¤Leopardi et al. under review)

Conclusions

- **U-Pb ages span between ~317 and 306 Ma**
- **New ages are in contradiction with previous ages between ~325 and 318 Ma**
- **Sn mineralization happened shortly after the formation of the ring dyke of the Altenberg-Teplice caldera (related to the caldera collapse)**
- **The importance of uplift associated with erosion in the south where the Altenberg-Teplice is located could potentially explain the absence of Sn mineralization in the Tharandt Forest caldera (potential for undercorver Sn deposits?)**

Acknowledgments

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Marie Guilcher | Analytics | m.guilcher@hzdr.de | www.hzdr.de/hif

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