

U-Pb Scheelite LA-ICP-MS Dates from the Historic Yellow Pine Pit, Yellow Pine Au-Sb-W Mining Area, Central Idaho, USA

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Antimony is Critical

- A critical mineral commodity is a commodity with a supply chain that is vulnerable to disruption, that serves an essential function in the manufacturing of a product, and the absence of which would cause significant economic or security consequences.
- **The United States relies on China for the majority of imported antimony, so the supply is vulnerable to disruption.**
- Largest single antimony use is in flame retardants.
- Stibnite (Sb_2S_3) is the main ore mineral for antimony (Sb).



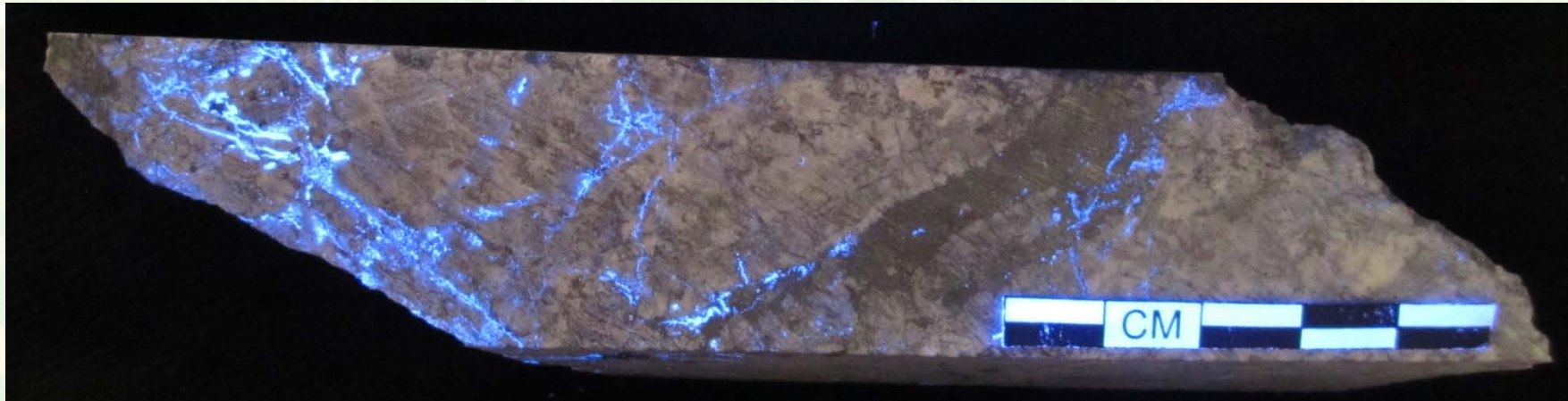
Stibnite from Wuling Mine in Jiangxi, China
(Photo courtesy of Robert Lavinsky)

Why Yellow Pine?

- **Most antimony documented in the United States.**
- Indicated antimony is over 155 million pounds with an additional ~25 million pounds inferred (Huss and others, 2014).
- Indicated gold is over 5 million ounces with an additional ~1 million ounces inferred (Huss and others, 2014).
- Pre-feasibility study was completed in 2014, mine development permit applications have been submitted to state and federal agencies, and a draft of the Environmental Impact Statement is expected in 2018 (Dail, pers. commun., 2017).
- Price of antimony is \$3.76 per pound as of 10-17-2017 (www.snl.com).
- Price of gold is \$1,283 per ounce as of 10-17-2017 (www.snl.com).
- The United States is 3rd in the world for active antimony projects, and Yellow Pine makes up over 98% of US antimony (www.snl.com).

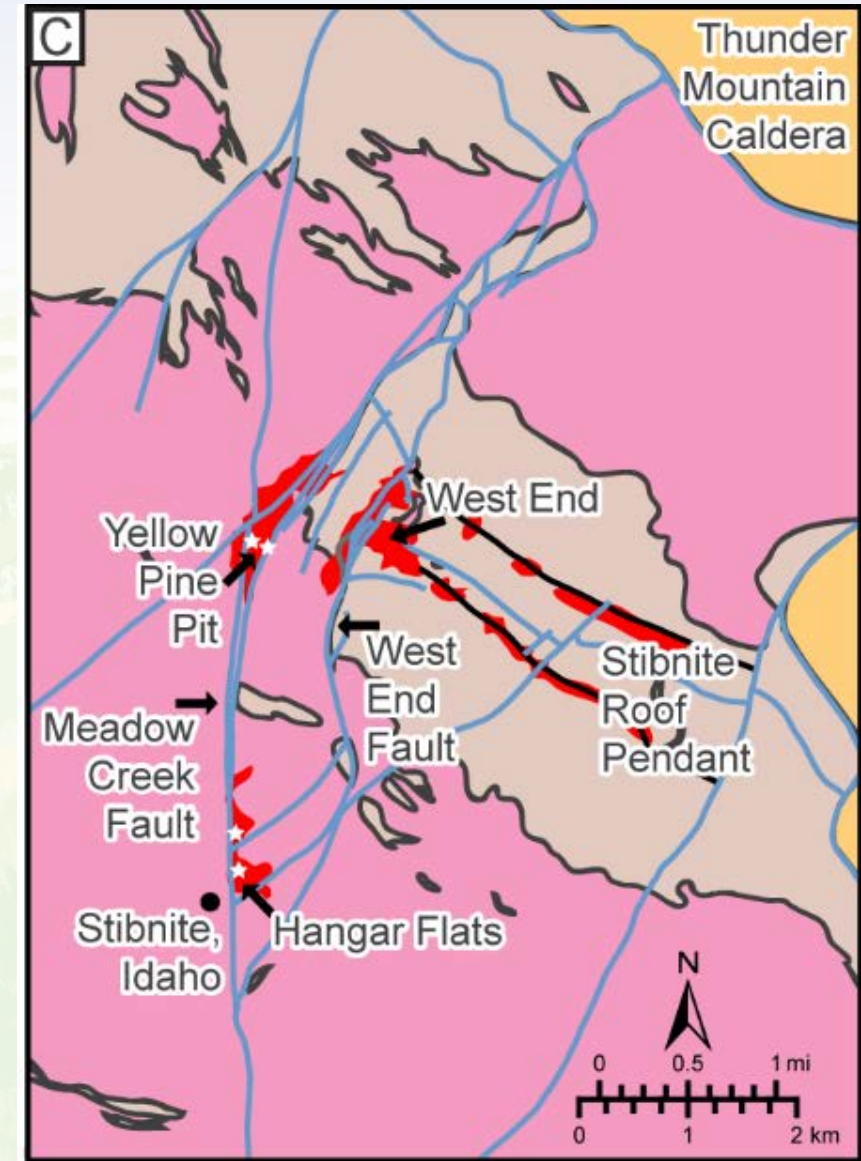
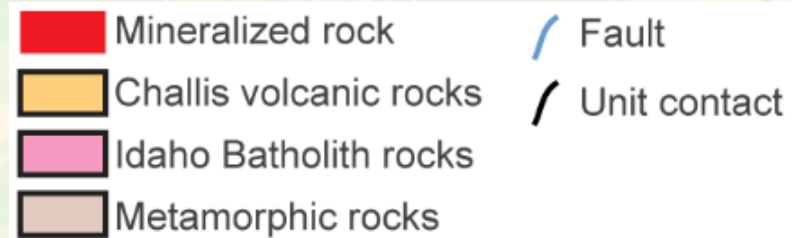
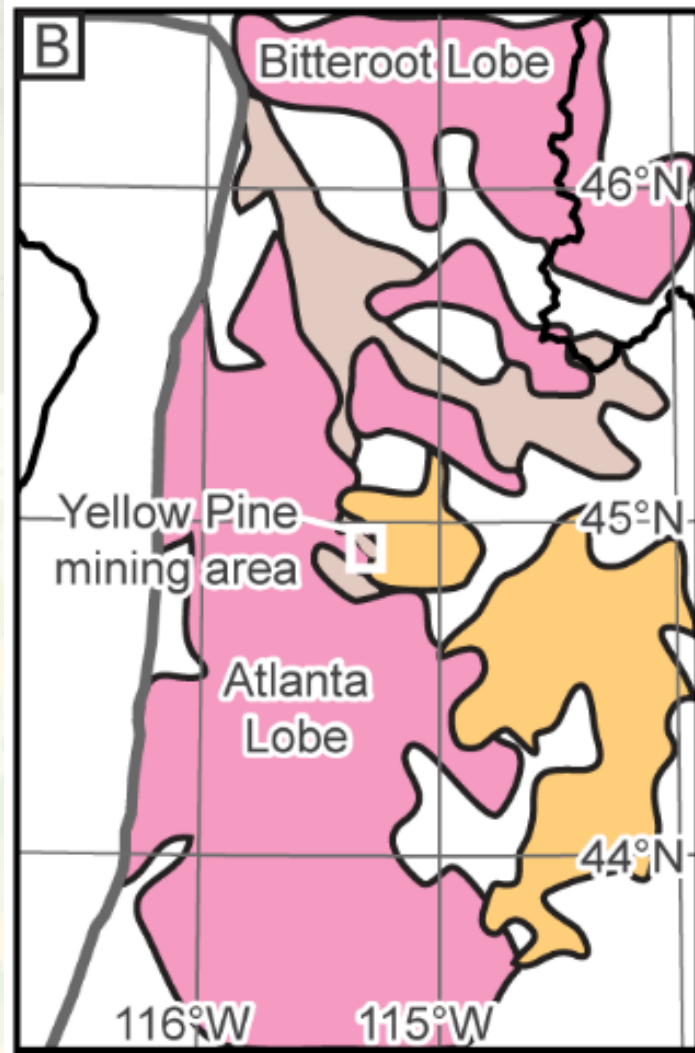
Ore Deposit Classification

- Gold-antimony epithermal deposit; that deposit type accounts for 20% of the world's antimony.
- Ore occurs mostly as disseminated auriferous arsenopyrite and pyrite hosted by granodiorite that is cut by scheelite and stibnite veins.

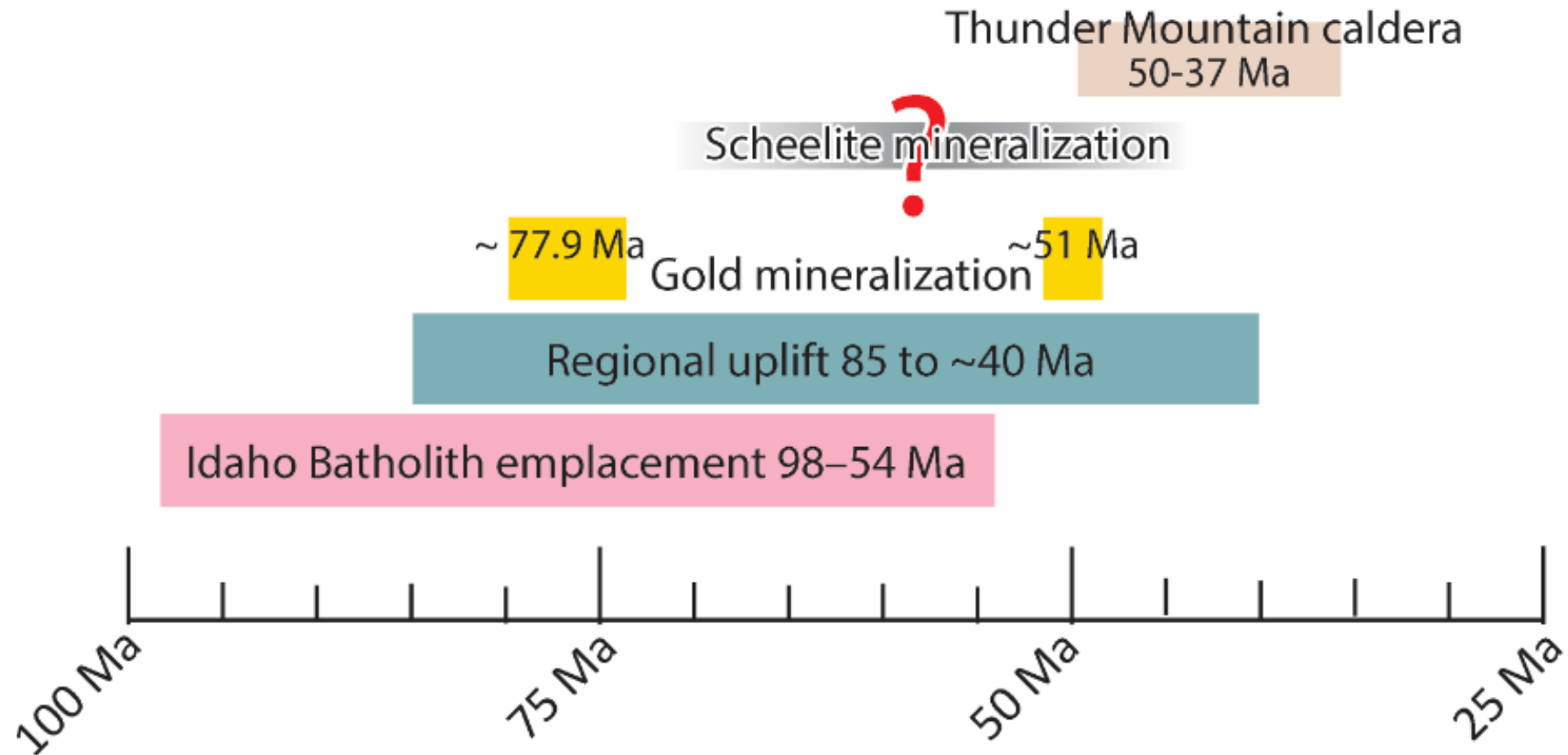


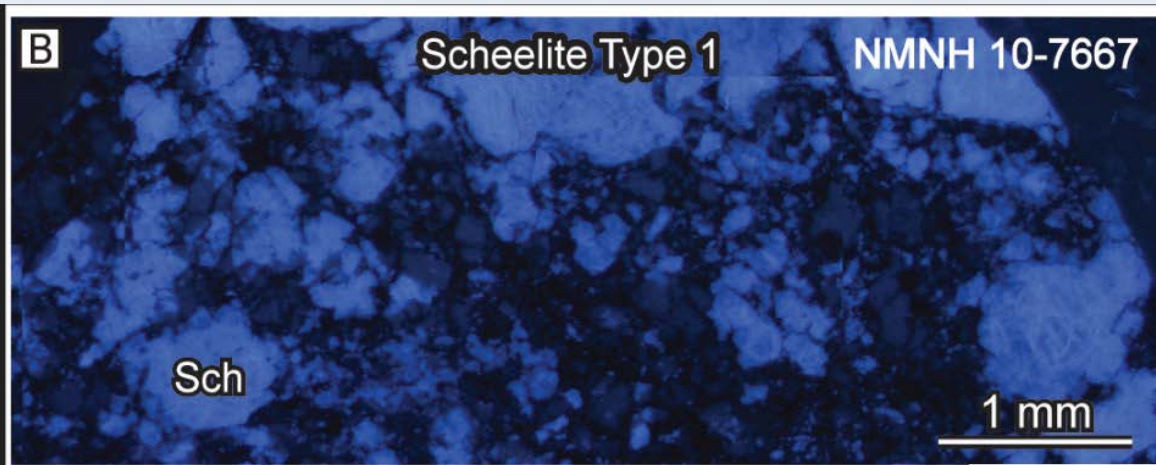
Drill core of granodiorite that hosts disseminated auriferous iron sulfide minerals all of which are cut by scheelite and stibnite veins; scheelite seen as blue fluorescent mineral. Sample access courtesy of Midas Gold Corporation.

Geology Overview

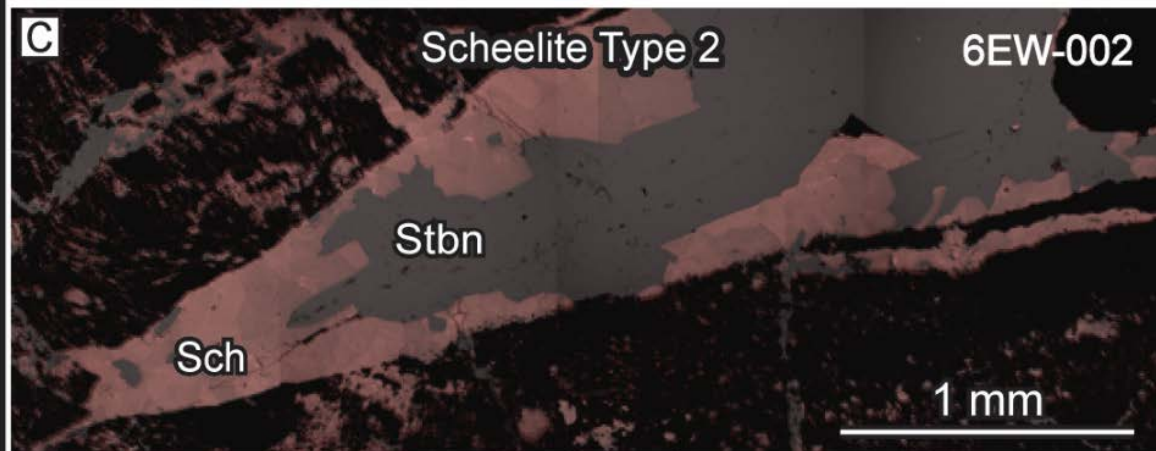


Geologic Timeline Regional and Local to Yellow Pine

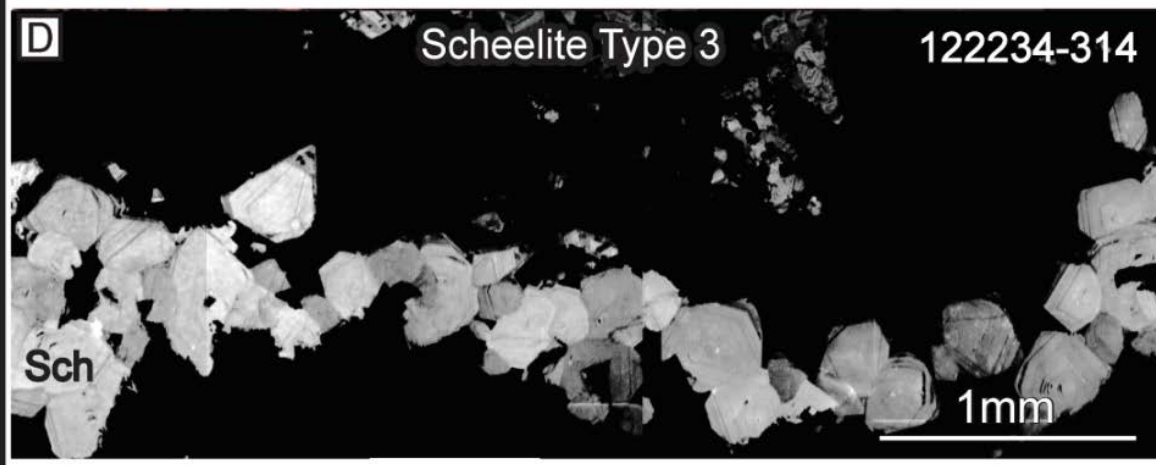




Type 1 description: Moderately bright brecciated scheelite (Sch) fragments shown here in shortwave UV light; this is a Smithsonian archived Yellow Pine pit scheelite ore sample loaned to me for this specific research.



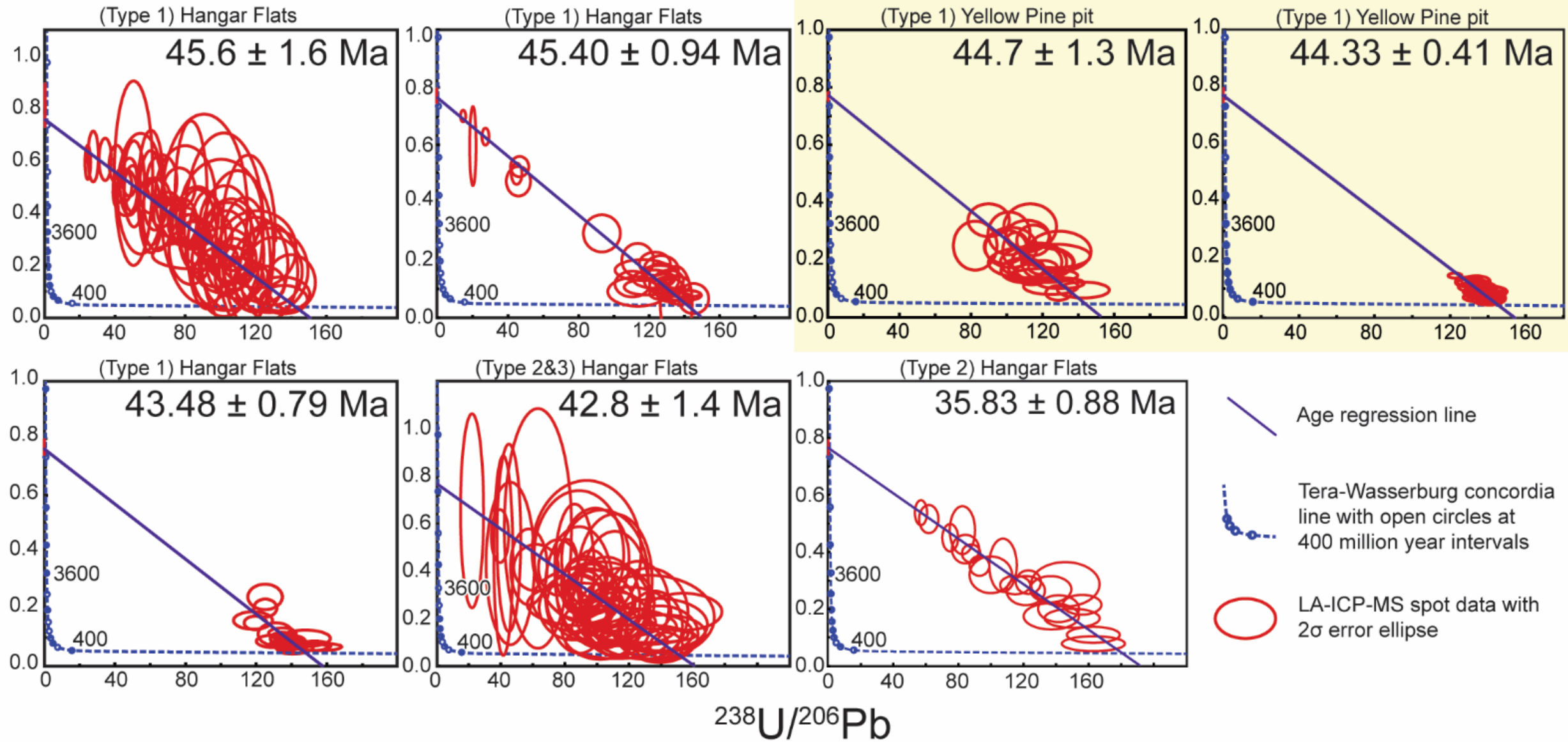
Type 2 description: brighter veins and disseminated grains of scheelite seen here in false color cathodoluminescent (CL) images. Note the stibnite (Stbn) is in textural equilibrium.



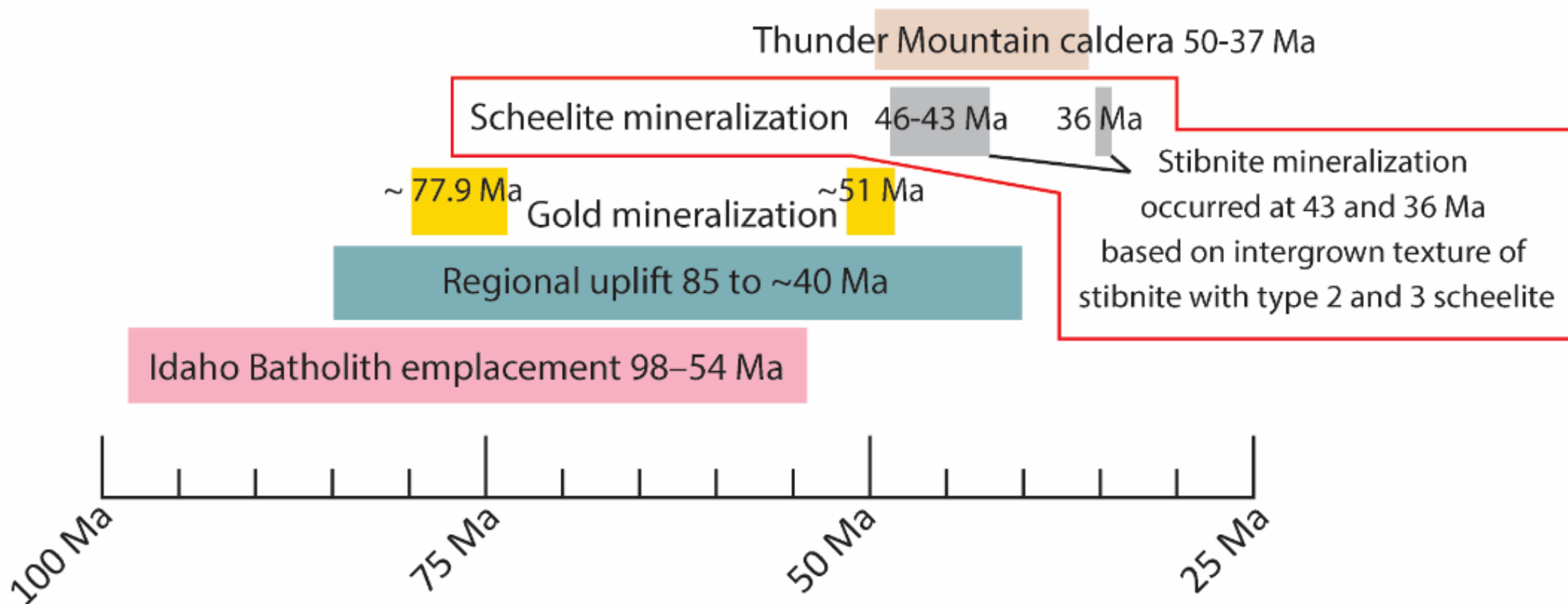
Type 3 description: oscillatory zoned subhedral scheelite grains in veins and vugs seen here as true color CL images. This scheelite type is intergrown with stibnite in place, but that texture is not shown in this particular image.

Two most recently obtained dates presented herein are highlighted in yellow

$^{207}\text{Pb}/^{206}\text{Pb}$



Geologic Timeline Regional and Local to Yellow Pine



What To Remember

- U-Pb scheelite geochronology shows Yellow Pine scheelite and stibnite mineralization is Eocene so coeval with the Thunder Mountain Caldera activity.

Special Thanks

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