

Volcanism

Snake River Plain – Yellowstone

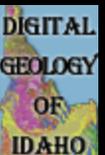
By Scott Hughes, Idaho State University

- Miocene to Quaternary Track of Rhyolitic Volcanism
- Late Pliocene to Quaternary Plains-Style Volcanism (mixed rhyolitic, intermediate, and basaltic volcanism)

Potentially Active Volcanoes of Western United States



Topinka, USGS/CVD, 1999, Modified from: Brantley, 1994, *Volcanoes of the United States: USGS General Interest Publication*



CRB

YNP

B-R

ESRP

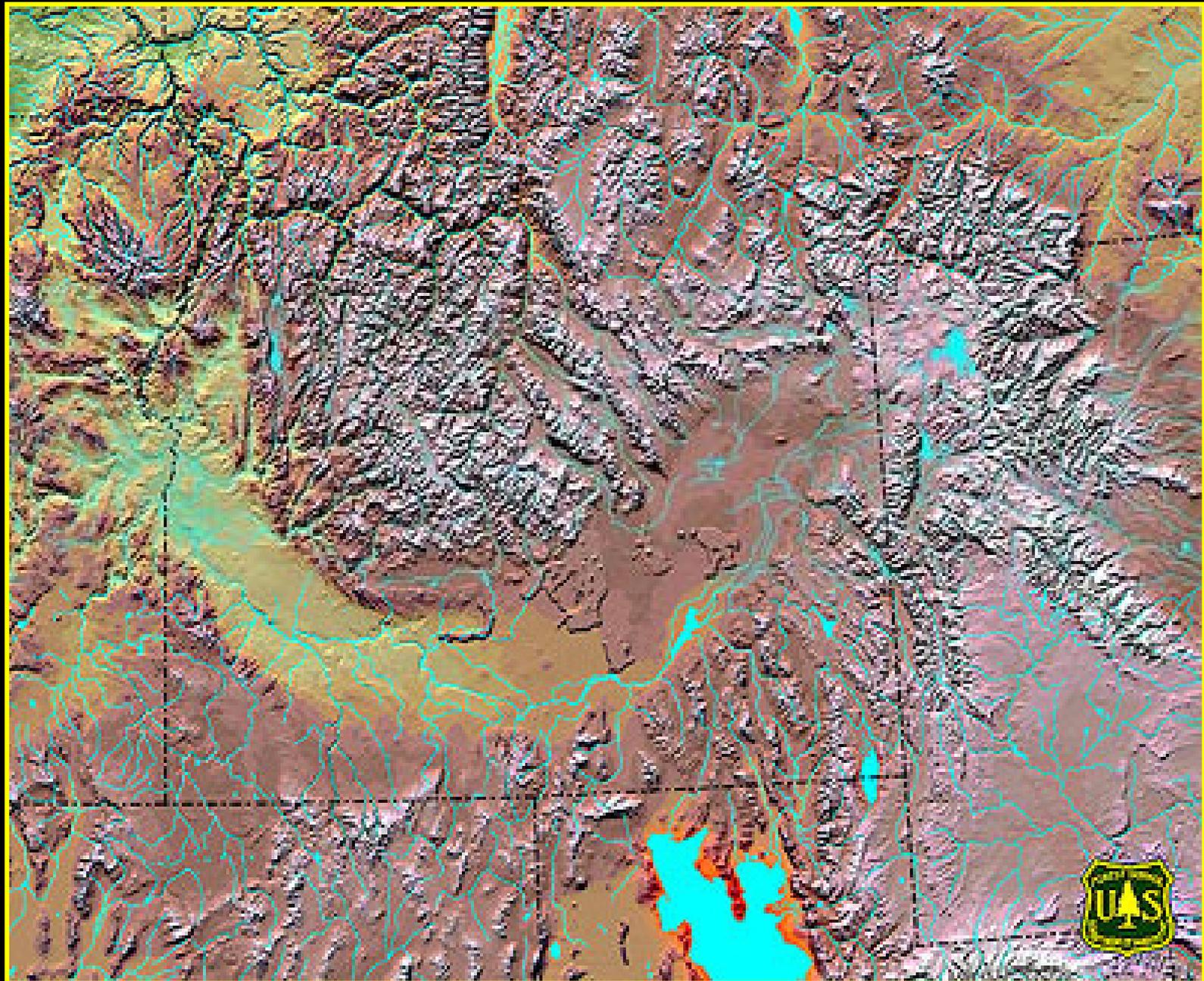
HLP

Snake River Plain

B-R

B-R

Snake River Plain Volcanic Province



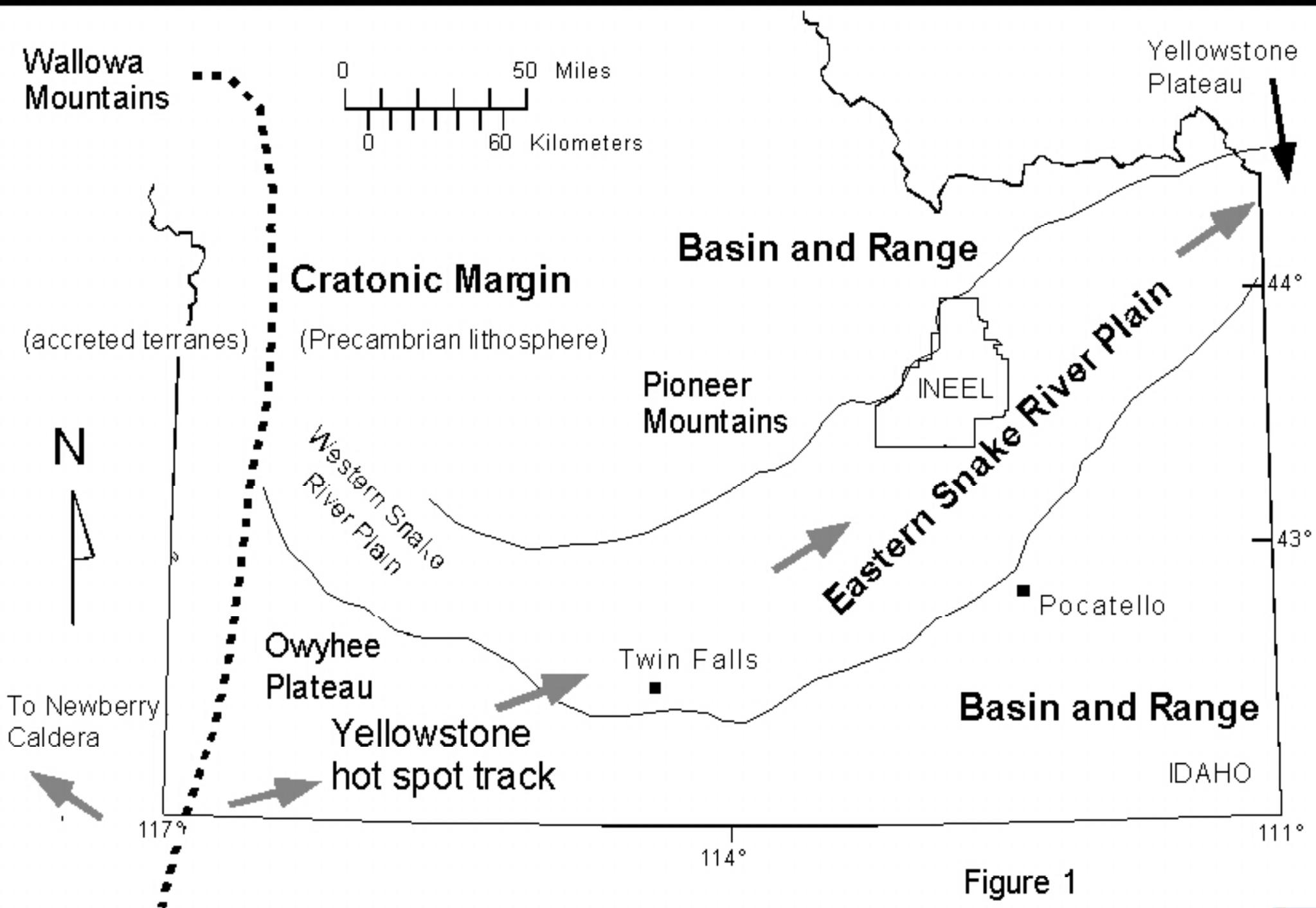
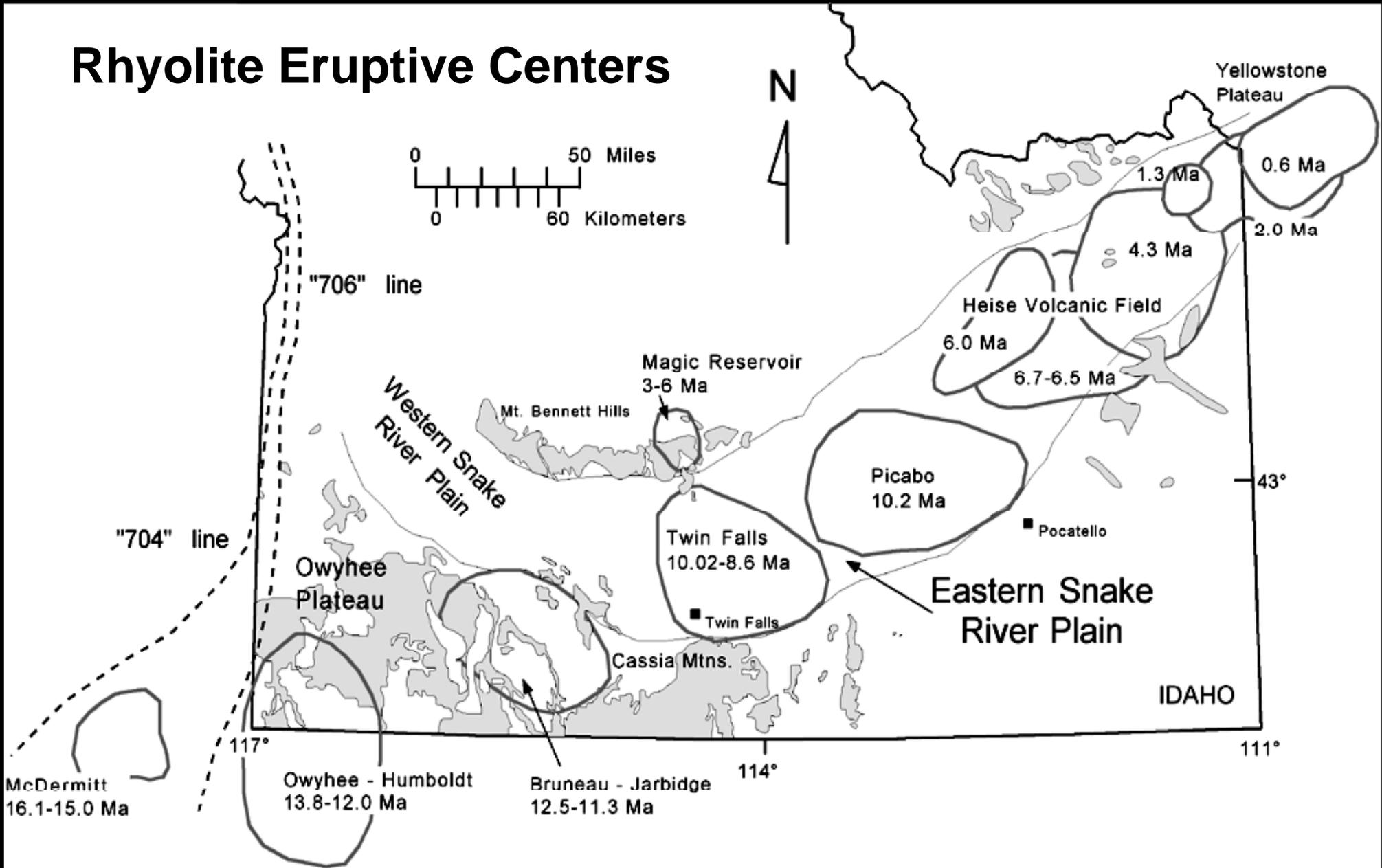


Figure 1

Rhyolite Eruptive Centers





Basalt flows in Bruneau River Canyon. Bill Bonnicksen with hat in lower left.



Snake River Plain ignimbrite, Cassia Mountains. White beds at base are fallout ash. Black glassy vitrophyre forms base of ignimbrite. Welding is densest in middle of ash flow.



Dense welding in rhyolite
ignimbrite, Cassia Mountains



Stack of ignimbrites, Cassia Mountains



Intra-caldera ash surge deposits within the Heise Caldera. Picture taken at Juniper boat launch area, Ririe Reservoir



Surge deposits in Heise caldera ash



Exposure of unwelded base and welded upper part of Mesa Falls tuff (1.2 Ma) north of Ashton



Unwelded base and slightly welded upper part of Mesa Falls tuff, north of Ashton



Grand Canyon of the Yellowstone River



Columnar basalt in Yellowstone River canyon

Lithophysal cavities in altered rhyolite ignimbrite



Old Faithful

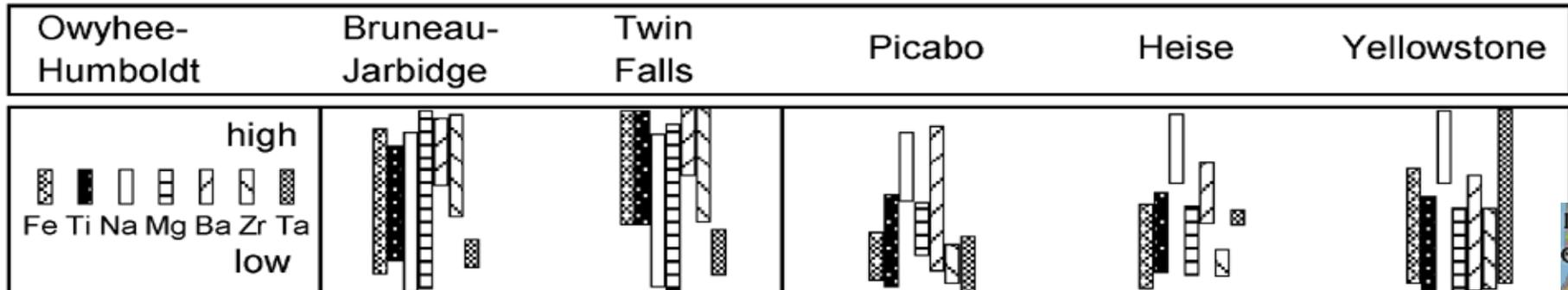
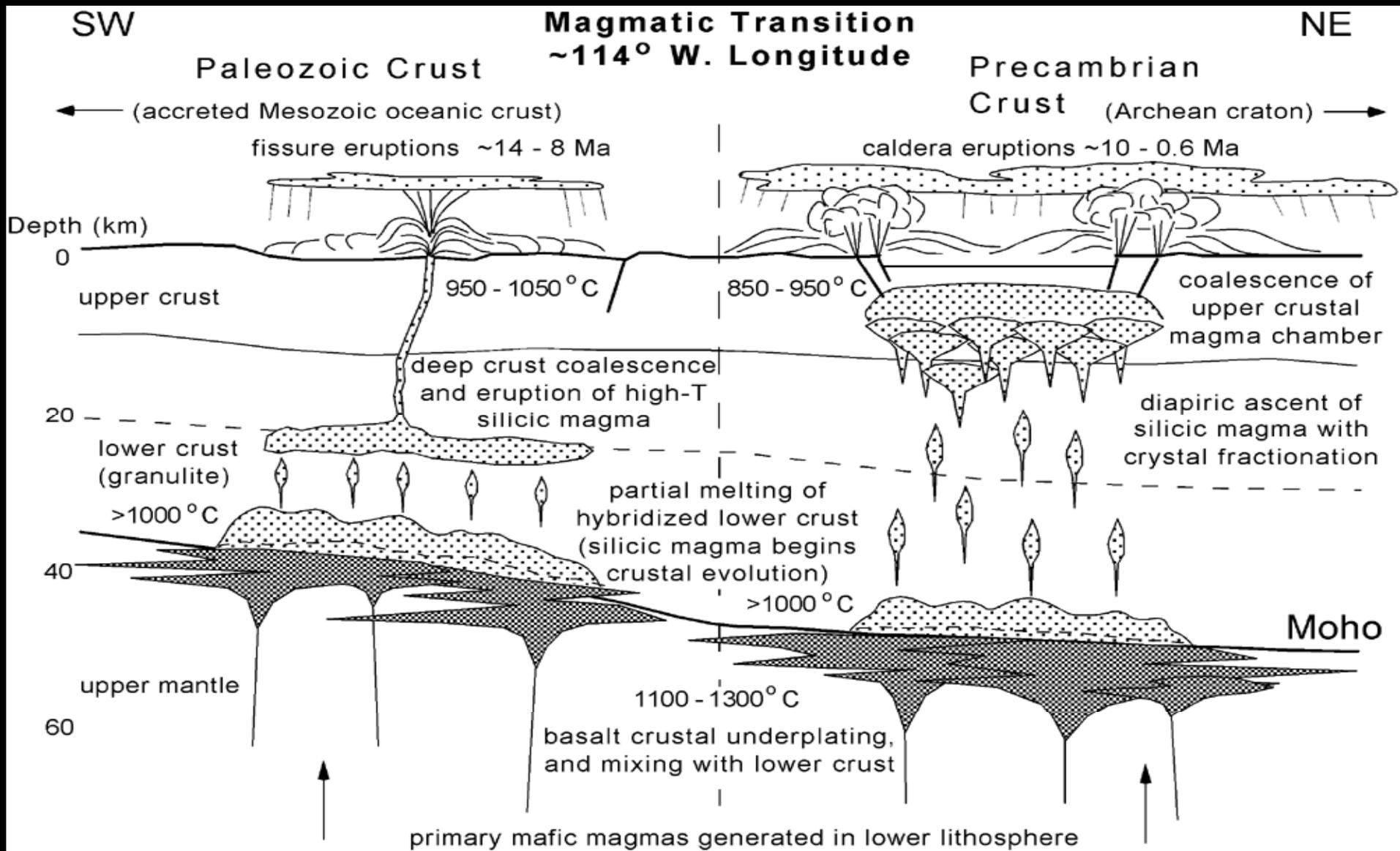




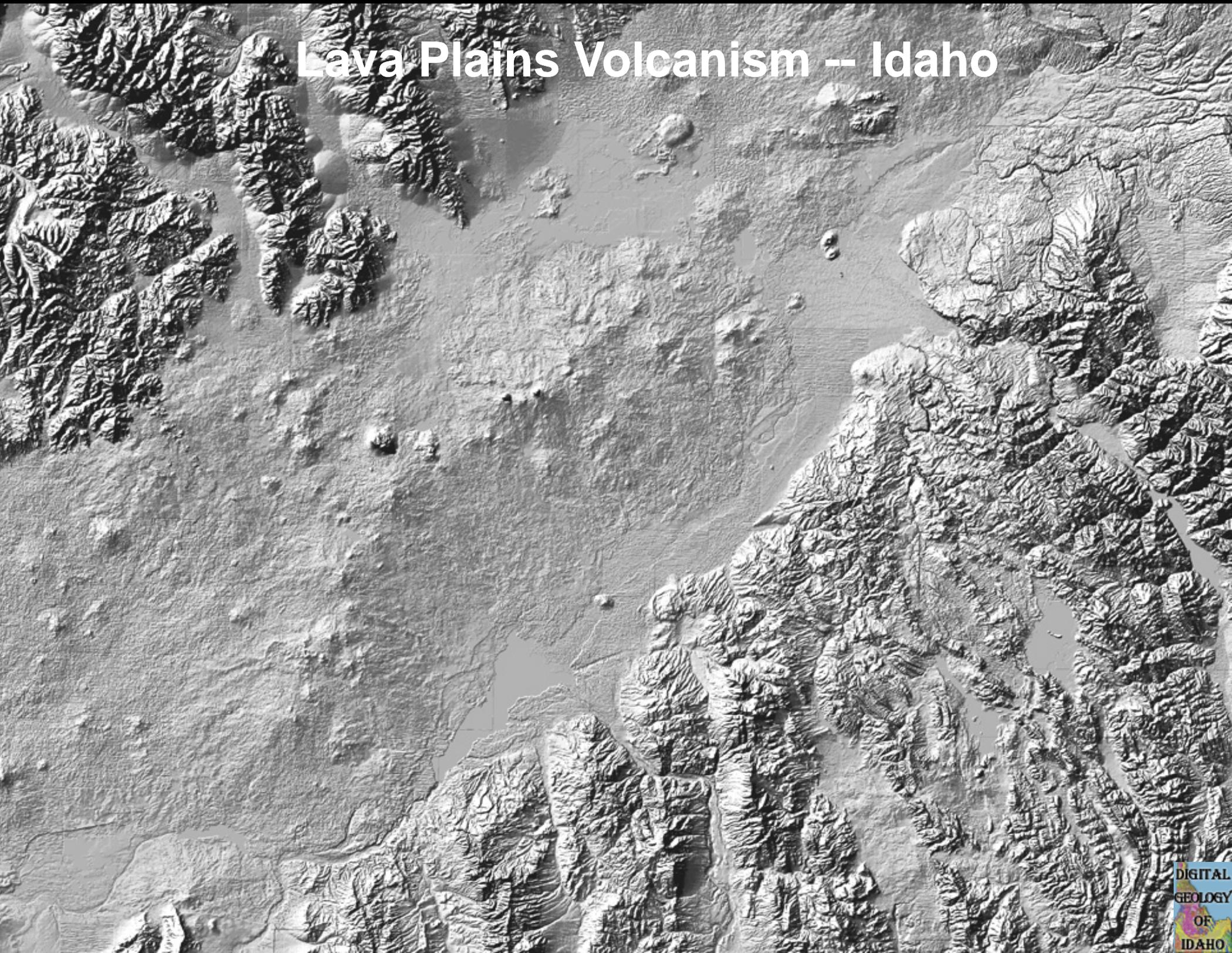
Acid sulfate hot pool, Yellowstone National Park



Sinter deposit near geyser



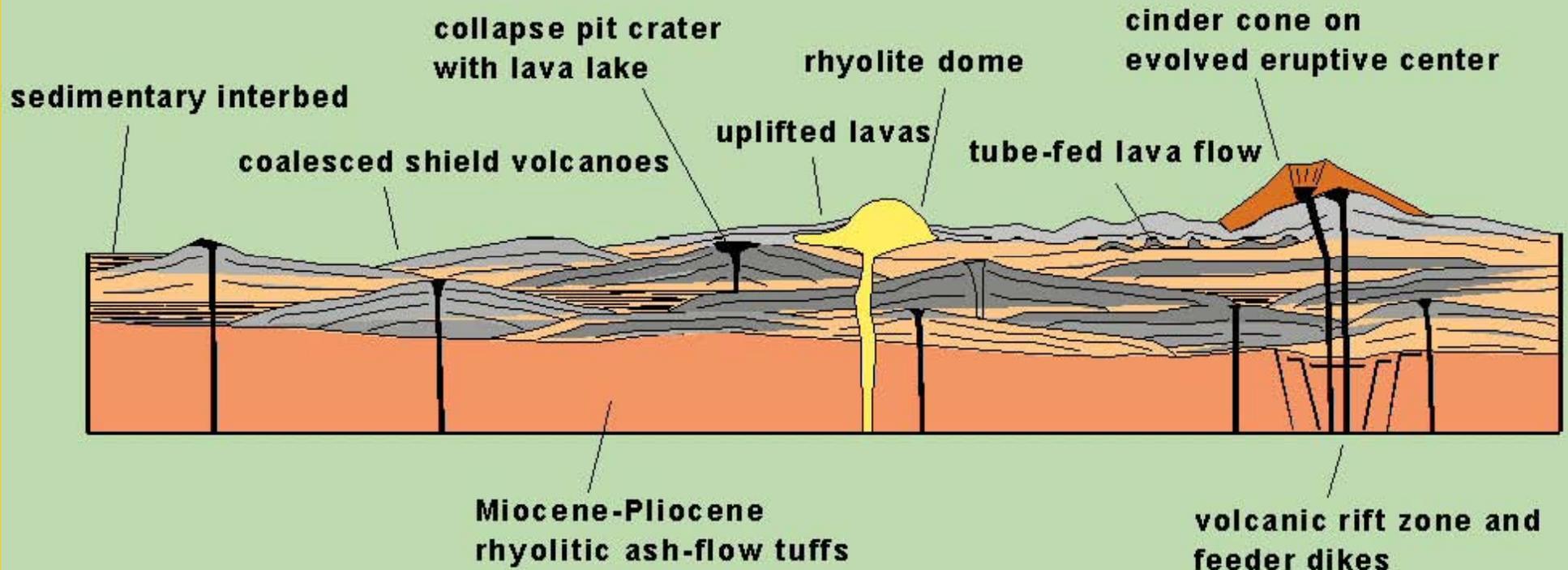
Lava Plains Volcanism -- Idaho



ESRP basaltic magmatism

- thousands of lava flows
- hundreds of small, **coalescent shields**
- eruption of small batches of low-viscosity magma

Quaternary Bimodal Magmatism Eastern Snake River Plain





Big Southern Butte



Big Southern Butte, a composite rhyolite dome



East and Middle Buttes on Snake River Plain



East Butte



A tuff ring on the Snake River Plain



Kings Bowl lava lake, Snake River Plain



Deflated basalt lava lake, Snake River Plain

ESRP Volcanism

– Table Legs Butte Shield Volcano (~200 ka)



Basaltic Shield with Cap



Diktytaxitic basalt

Quaking Aspen Butte



Summit region

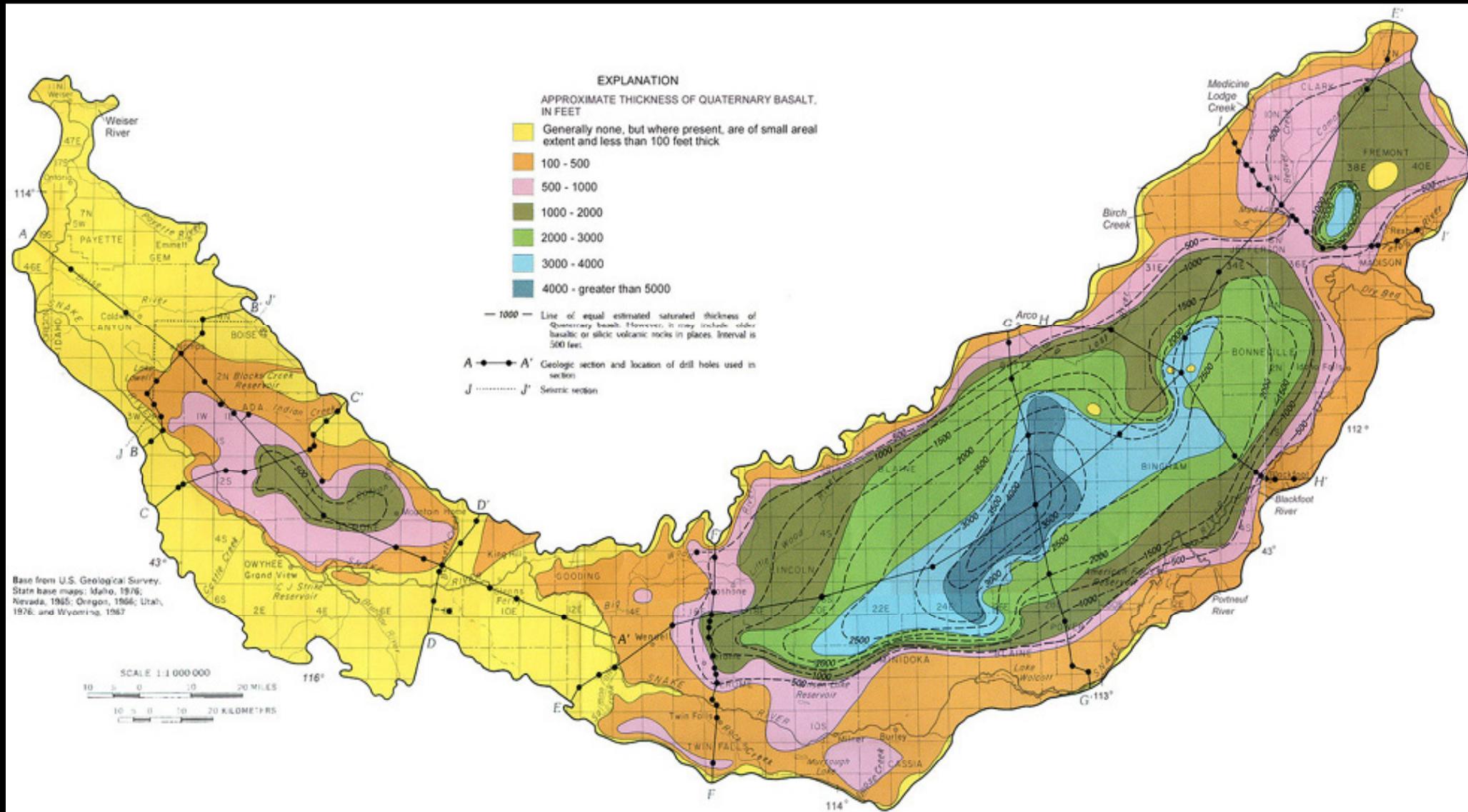




Quaking Aspen Butte



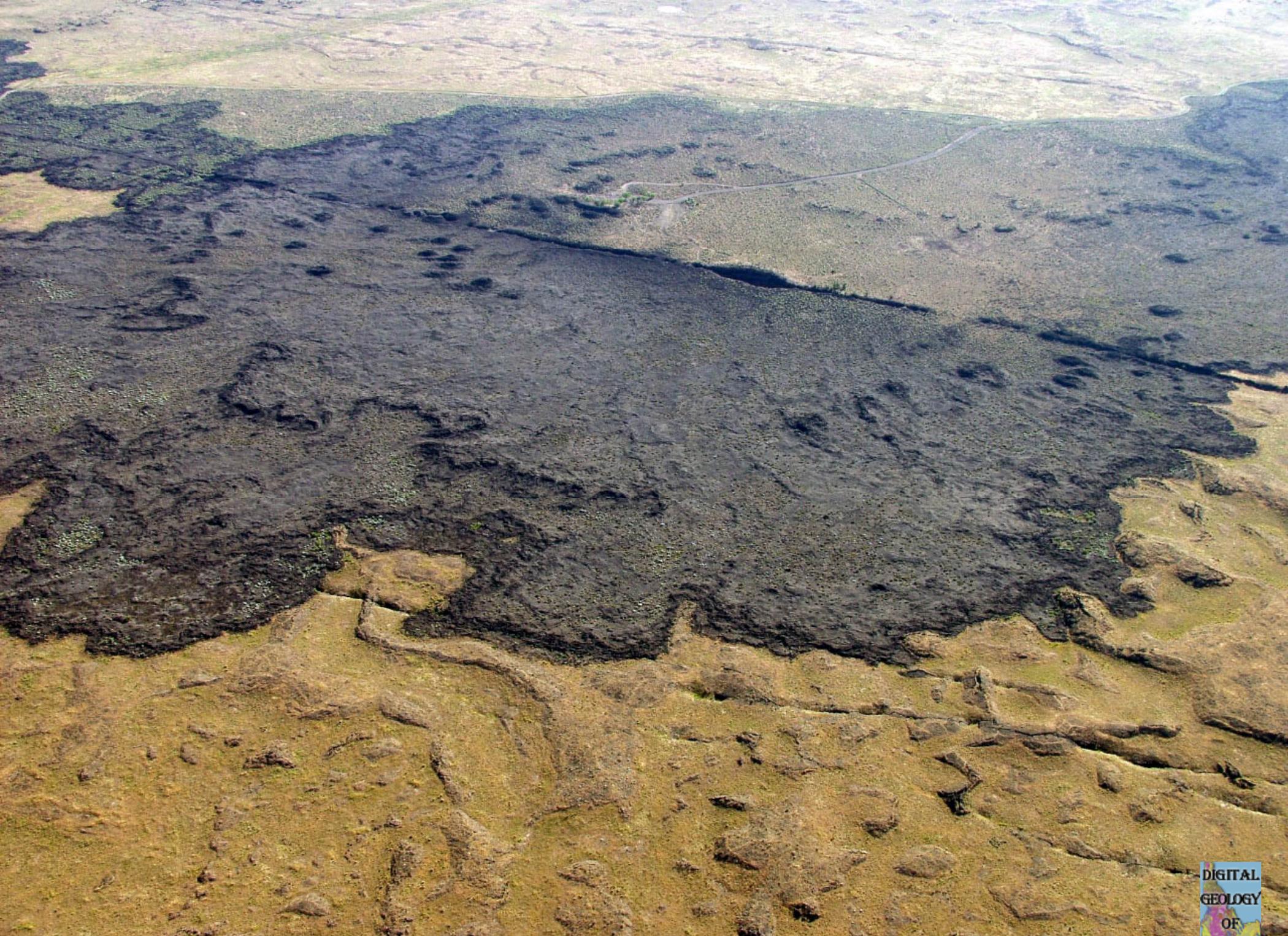
Quaking Aspen Butte and Big Southern Butte



Thickness of Quaternary Basalt, Snake River Plain, from Whitehead, USGS



Kings Bowl explosion crater and great rift



Great Rift, Snake River Plain



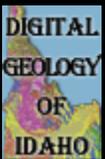
Cinder Cones at Craters of the Moon



Explosion Pit



Hot Lava, Hawaii





Basalt Lava Tube, Snake River Plain



Entrance to lava tube, Craters of the Moon



Squeeze up on edge of lava lake, Craters of the Moon



Craters of the Moon



Craters of the Moon



Cinders and Bombs

Menan Buttes, Snake River Plain





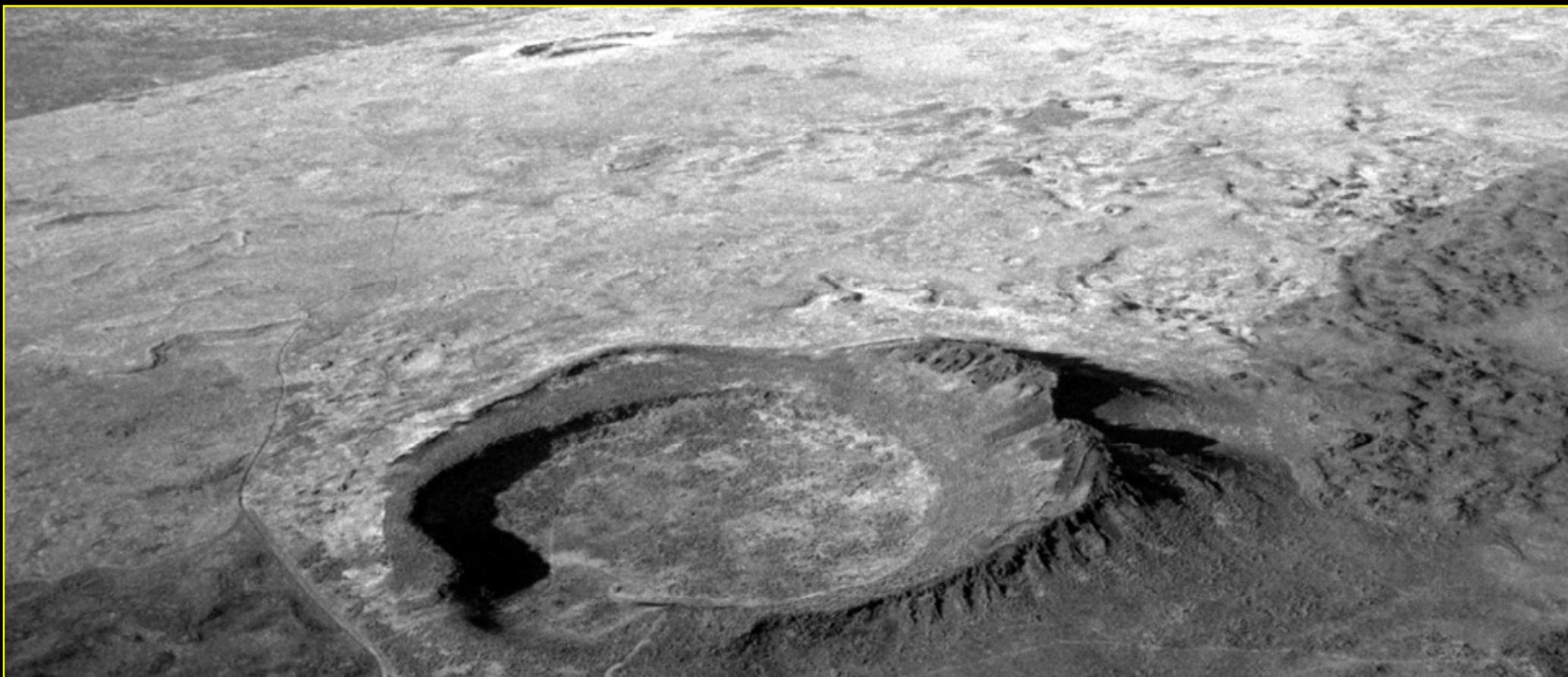
Menan Buttes, a tuff ring system



Basaltic cinder cone



Big Southern Butte



**Split Butte --
Eastern Snake
River Plain**





Basalt eruptive cone at Craters of the Moon