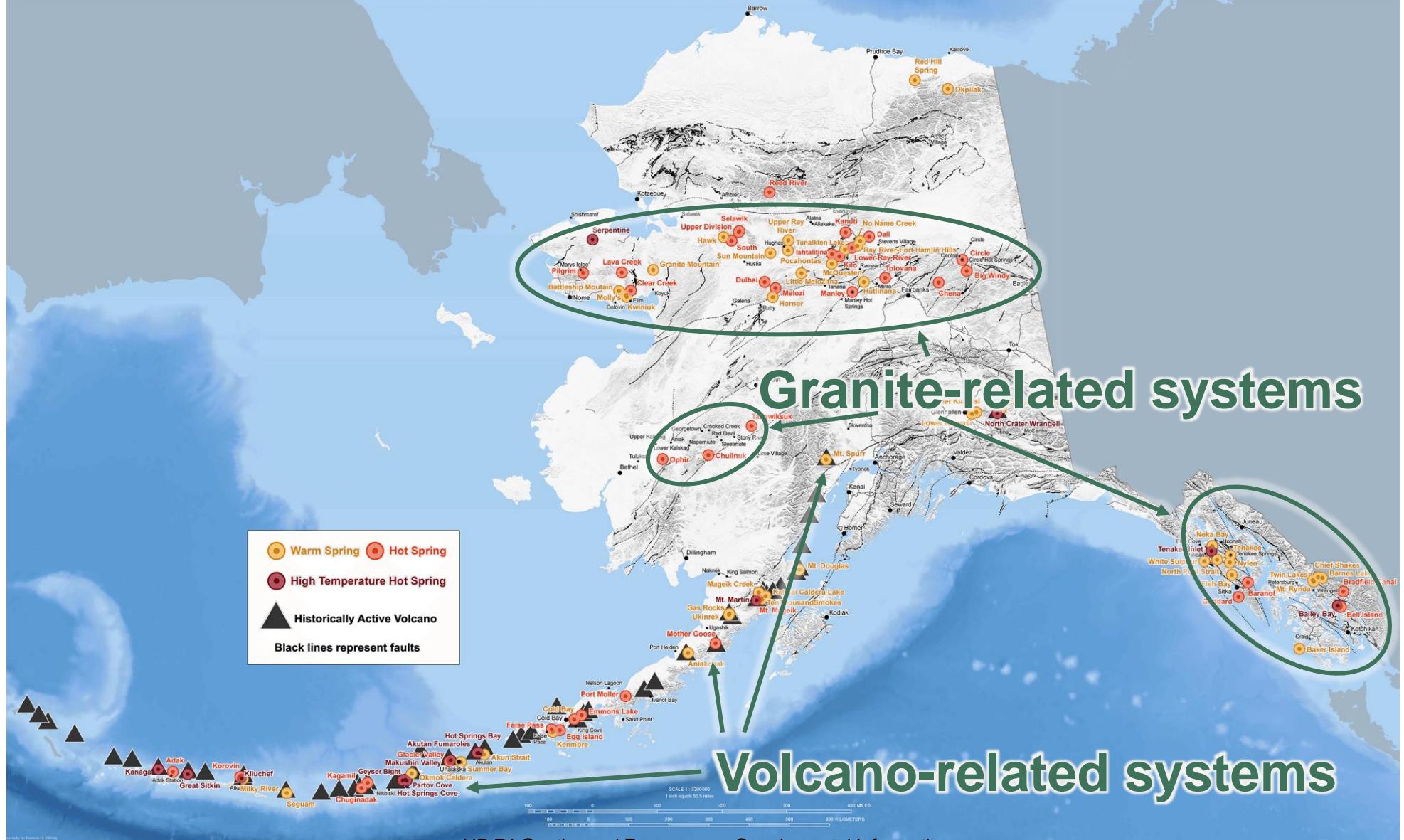


SUPPLEMENTAL INFORMATION

GEOTHERMAL SYSTEMS OF ALASKA



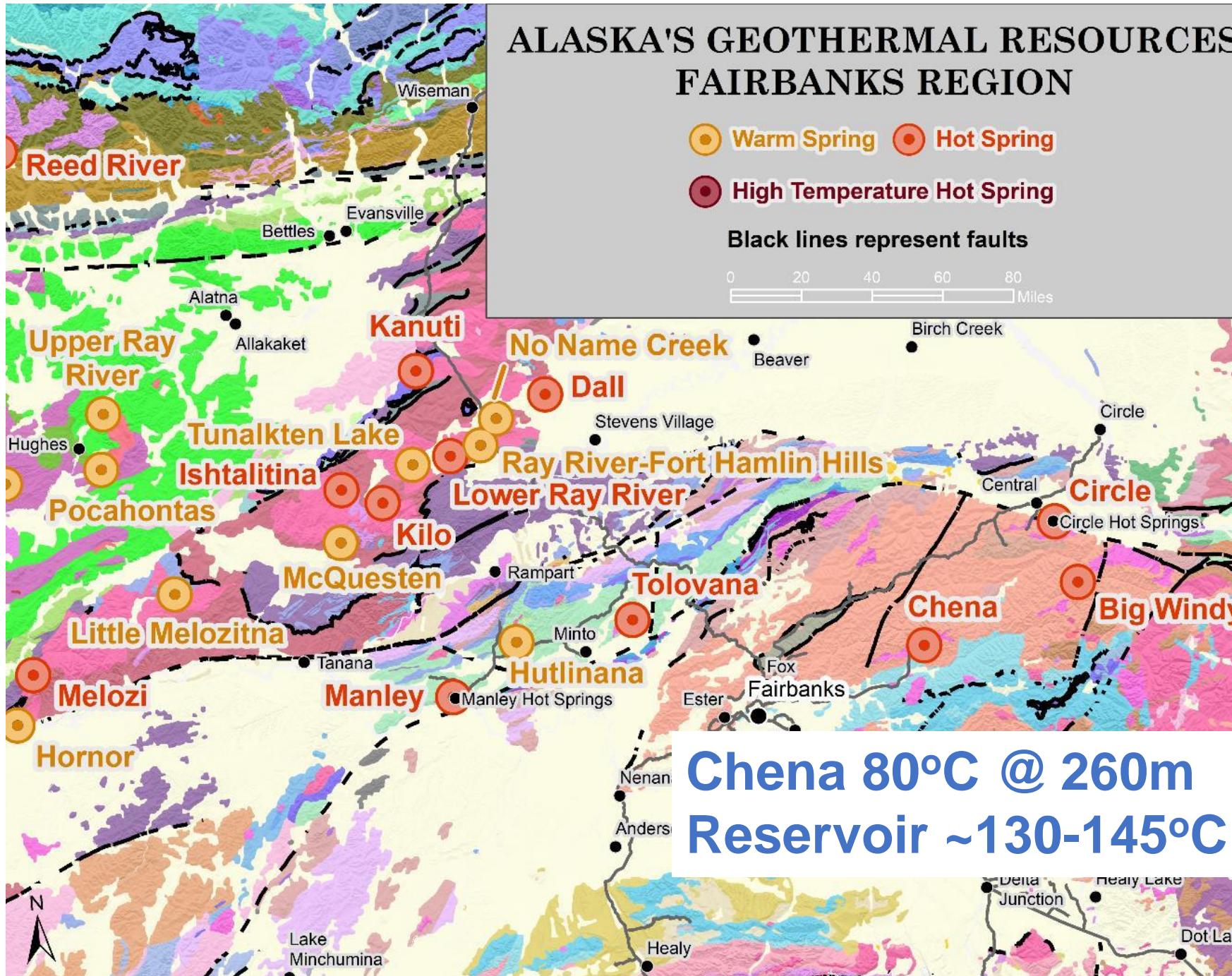
ALASKA'S GEOTHERMAL RESOURCES FAIRBANKS REGION

● Warm Spring ● Hot Spring

● High Temperature Hot Spring

Black lines represent faults

0 20 40 60 80 Miles



GEOTHERMAL SYSTEMS: FAIRBANKS REGION

Chena 80°C @ 260m
Reservoir ~130-145°C

ALASKA'S GEOTHERMAL RESOURCES SEWARD PENINSULA

Pilgrim – 92°C @
120m
Reservoir ~ 150°C



GEOTHERMAL
SYSTEMS:
SEWARD
PENINSULA
REGION

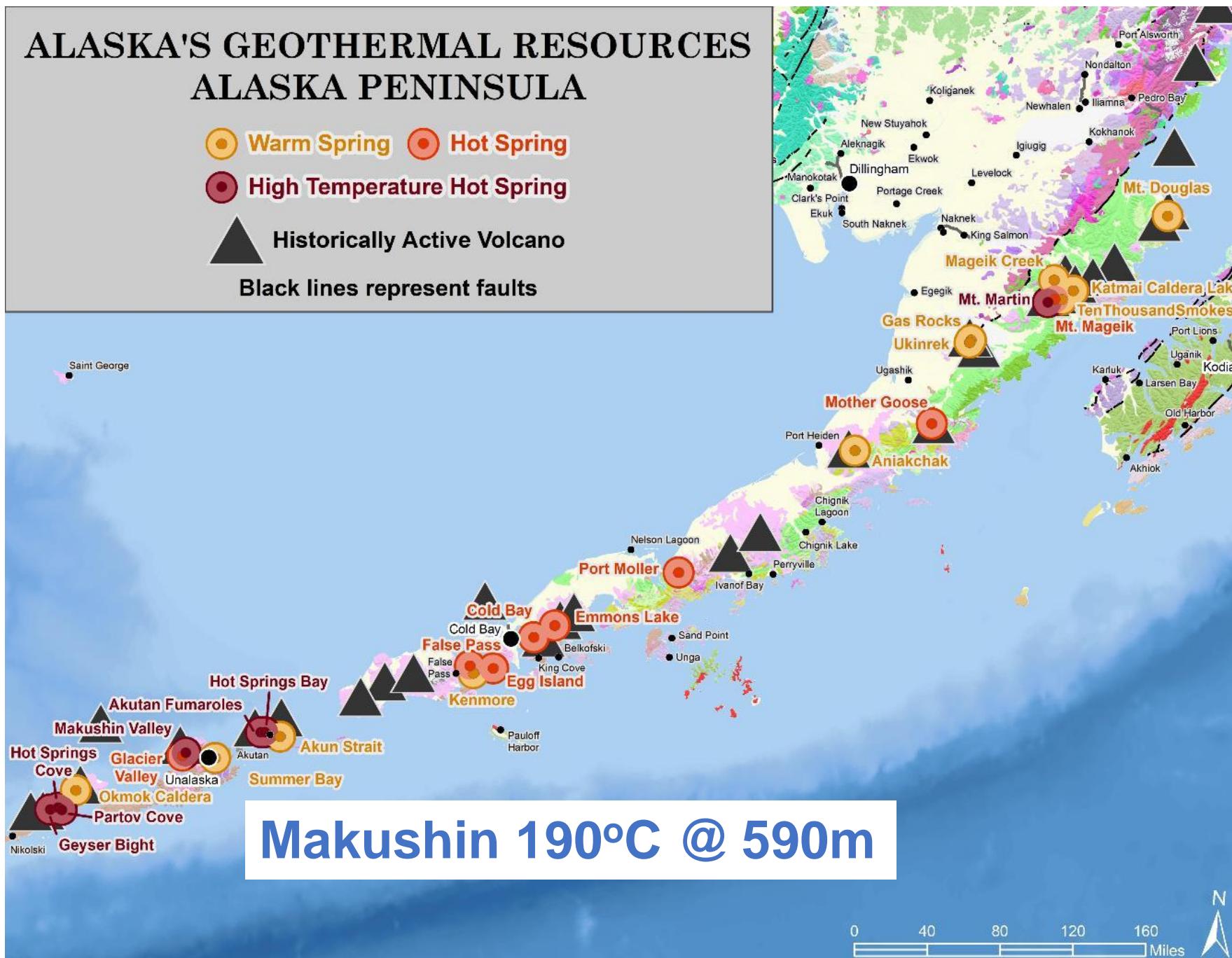
ALASKA'S GEOTHERMAL RESOURCES ALASKA PENINSULA

● Warm Spring ● Hot Spring

● High Temperature Hot Spring

▲ Historically Active Volcano

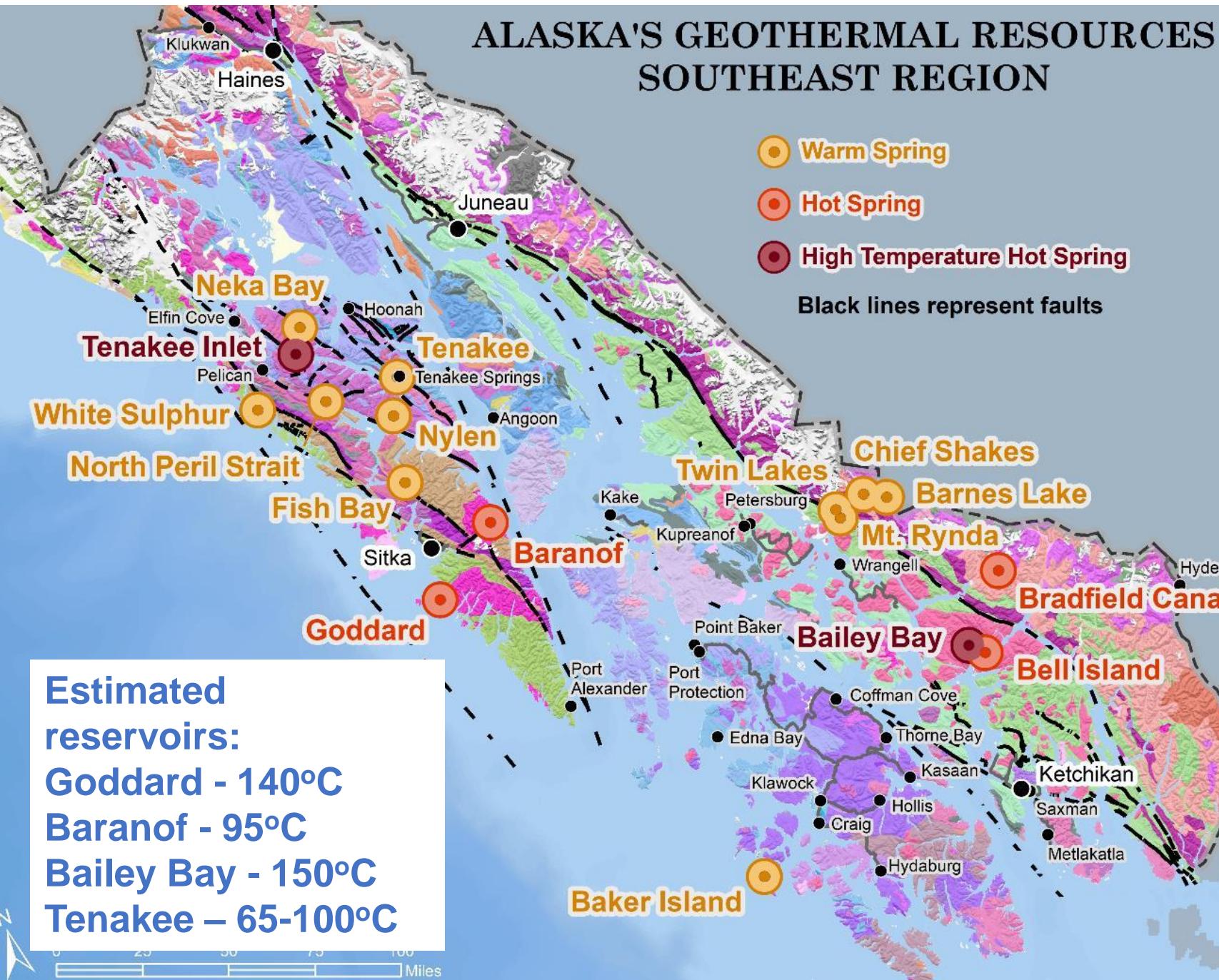
Black lines represent faults



GEOTHERMAL SYSTEMS: ALASKA PENINSULA REGION

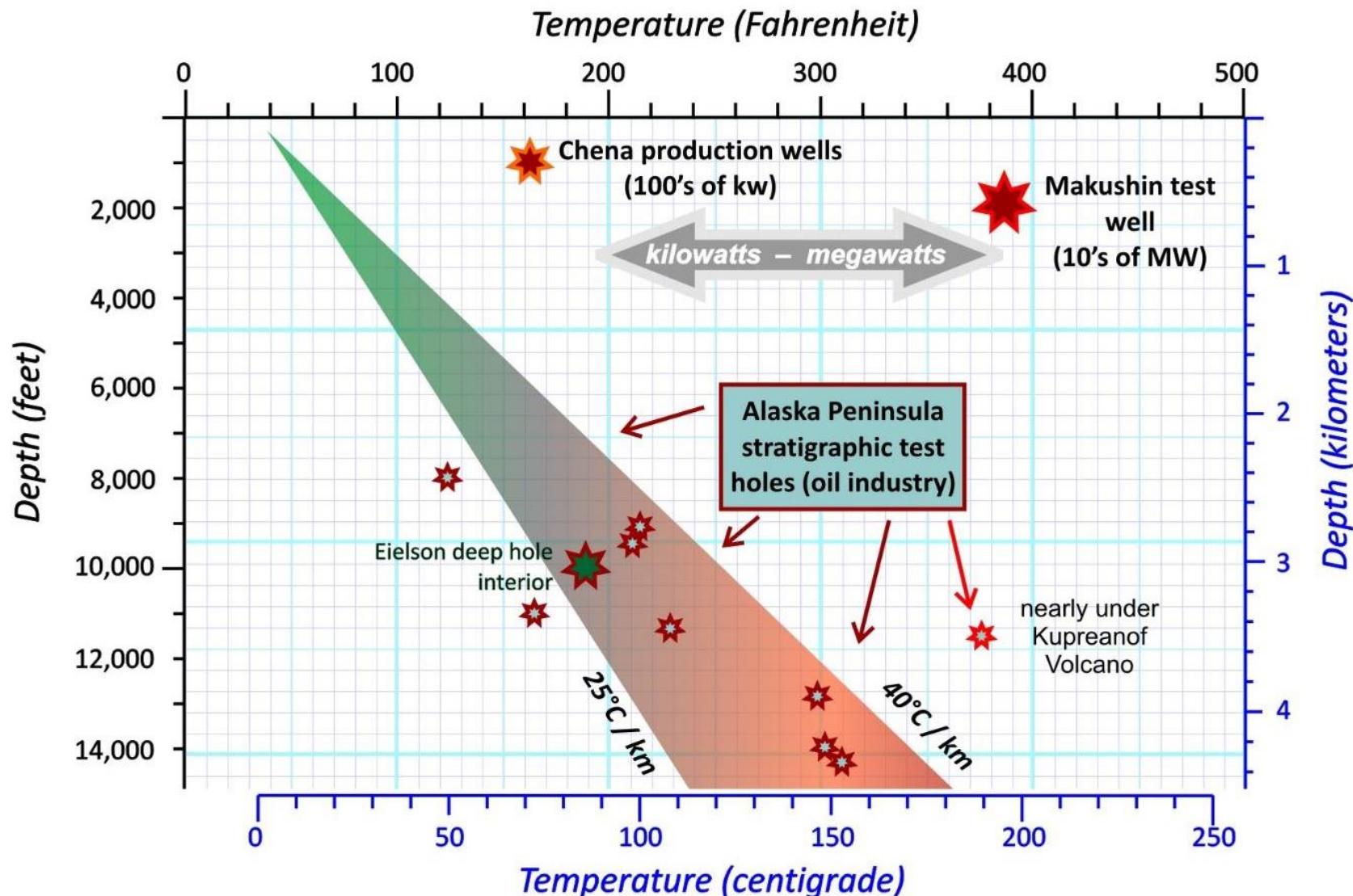
Makushin 190°C @ 590m

ALASKA'S GEOTHERMAL RESOURCES SOUTHEAST REGION



GEOTHERMAL SYSTEMS: SOUTHEAST REGION

GEOTHERMAL GRADIENTS



DRILLING REGULATIONS

Division of Oil & Gas (DOG)

- Licenses or leases for access to the resource (subsurface use)
- Surface-use permitting (pads, facilities, and infrastructure) in support of exploration and development

Alaska Oil & Gas Conservation Commission (AOGCC)

- Ensures prevention of waste, protects correlative rights, improves ultimate recovery, and protects underground freshwater aquifers
- Issues of permits to drill wells is AOGCC's jurisdiction
- Jurisdiction over geothermal triggered by temperature ($>120^{\circ}\text{C}$) or commerciality. *New definition ignores temperature*
- Domestic, noncommercial, or small-scale industrial geothermal well not under AOGCC authority
- Exception: if well *may encounter geothermal resources, fluid, or water of enough heat/pressure to threaten life/health*

Department of Environmental Conservation (DEC)

- If the incidental discharge enters surface water, need Alaska Pollutant Discharge Elimination System (APDES) permit
- DEC Division of Water has permitted geothermal discharges using Plan Review in Lieu of Permit
- Engineering Support and Plan Review (ESPR) conducts plan reviews for smaller systems in municipality (heating or cooling pumps at UAA, U-med district, hatchery, etc.)
- DEC issues permits for *hydrostatic testing, including flushing and aquifer pump testing*
 - General permit AKG003000 provides for coverage of land disposal or discharge to surface water
 - One geothermal-related authorization, issued in 2015 for the Akutan Geothermal Project