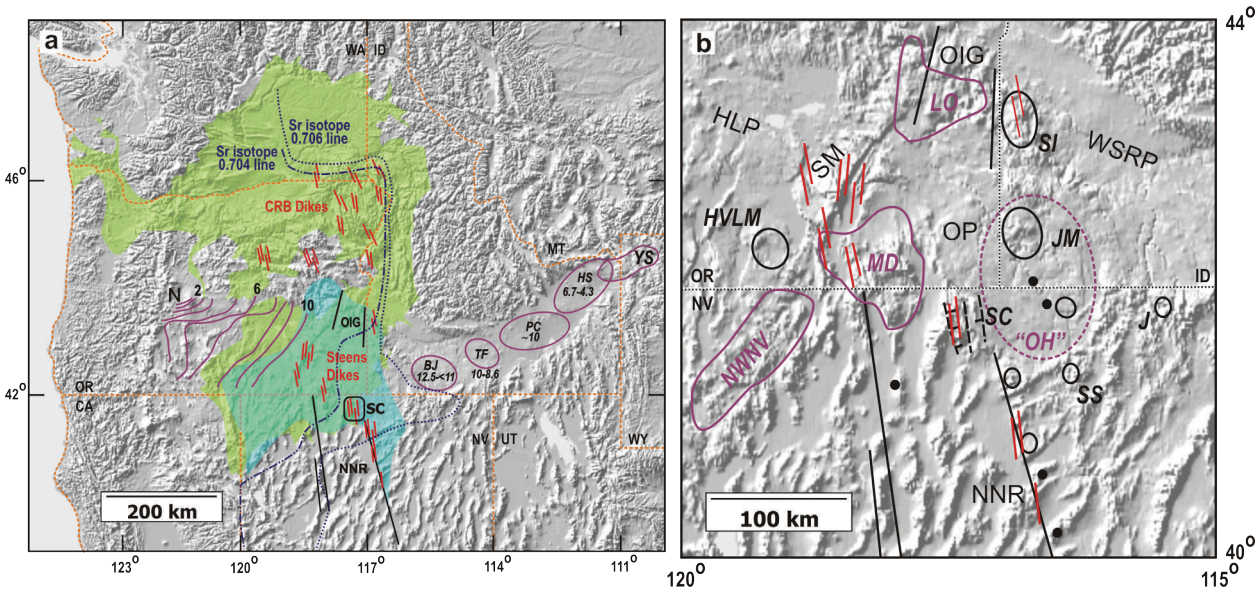

Figure 1. (a) Shaded relief map of the northwestern United States depicting selected Cenozoic tectonomagmatic features. Green shading depicts the region where mid-Miocene Columbia River (WA-OR-ID) and Steens (OR-NV-ID -CA) flood basalt lava flows crop out (after Hart and Carlson, 1985; Camp and Ross, 2004). The major flood basalt dike swarms/eruptive loci are depicted as red lines, the Oregon-Idaho graben and magnetic anomalies corresponding to zones of lithospheric extension/mafic magma emplacement are depicted as black lines (Cummings and others, 2000; Glen and Ponce, 2002). The SC is labeled and surrounded by a black enclosure. The purple ovals are the silicic-dominated volcanic systems of the Snake River Plain-Yellowstone province; BJ, Bruneau-Jarbidge (~12.5 to <11 Ma); TF, Twin Falls (~10 to 8.6 Ma); PC, Picabo (~10 Ma); HS, Heise (~6.7 to 4.3 Ma); and YS, Yellowstone (<2.5 Ma), and the purple lines are the age isochrons associated with Oregon High Lava Plains silicic activity (N, Newberry Volcano; after Jordan and others, 2004). The initial $^{87}Sr/^{86}Sr$ 0.706 and 0.704 isopleths are depicted as dotted and dashed blue lines, respectively (after Armstrong and others, 1977; Kistler and Peterman, 1978; Leeman and others, 1992; Crafford and Grauch, 2002). These are commonly interpreted to define the western edge of the Precambrian North American craton (the 0.706 isopleth), and a zone of transitional lithosphere between the older craton and Mesozoic accreted terranes to the west (between the two isopleths). **(b)** Shaded relief map of the southwestern Oregon Plateau (area underlain by Steens Basalt in Fig. 1a) and surrounding region depicting mid-Miocene silicic volcanic systems in close proximity to the Santa Rosa-Calico volcanic field (SC). Volcanic fields are depicted in purple: MD, McDermitt; LO, Lake Owyhee; and NWNV, Northwest Nevada (e.g., Virgin Valley, High Rock, Hog Ranch, and unnamed calderas). "OH" (dashed purple oval) is the region commonly depicted as the ~16- to 13-Ma Owyhee-Humboldt volcanic field which also overlaps with the southern extent of the Owyhee Plateau. Black circles are less voluminous mid-Miocene silicic centers and include the HVLM, Hawks Valley-Lone Mountain dome complex; SI, Silver City-Delamar dome complex; JM, Juniper Mountain volcanic center; SS, Snowstorm Mountains dome complex; J, Jarbidge. Unidentified black dots are other mid-Miocene silicic centers. Other abbreviations are as follows: HLP, High Lava Plains; SM, Steens Mountain; OIG, Oregon-Idaho graben; WSRP, western Snake River Plain; OP, Owyhee Plateau, which extends south, east, and north to the area depicted as the Owyhee-Humboldt volcanic field; NNR, northern Nevada rift and related lineaments. Other mid-Miocene extensional features from Figure 1a are depicted as black lines.