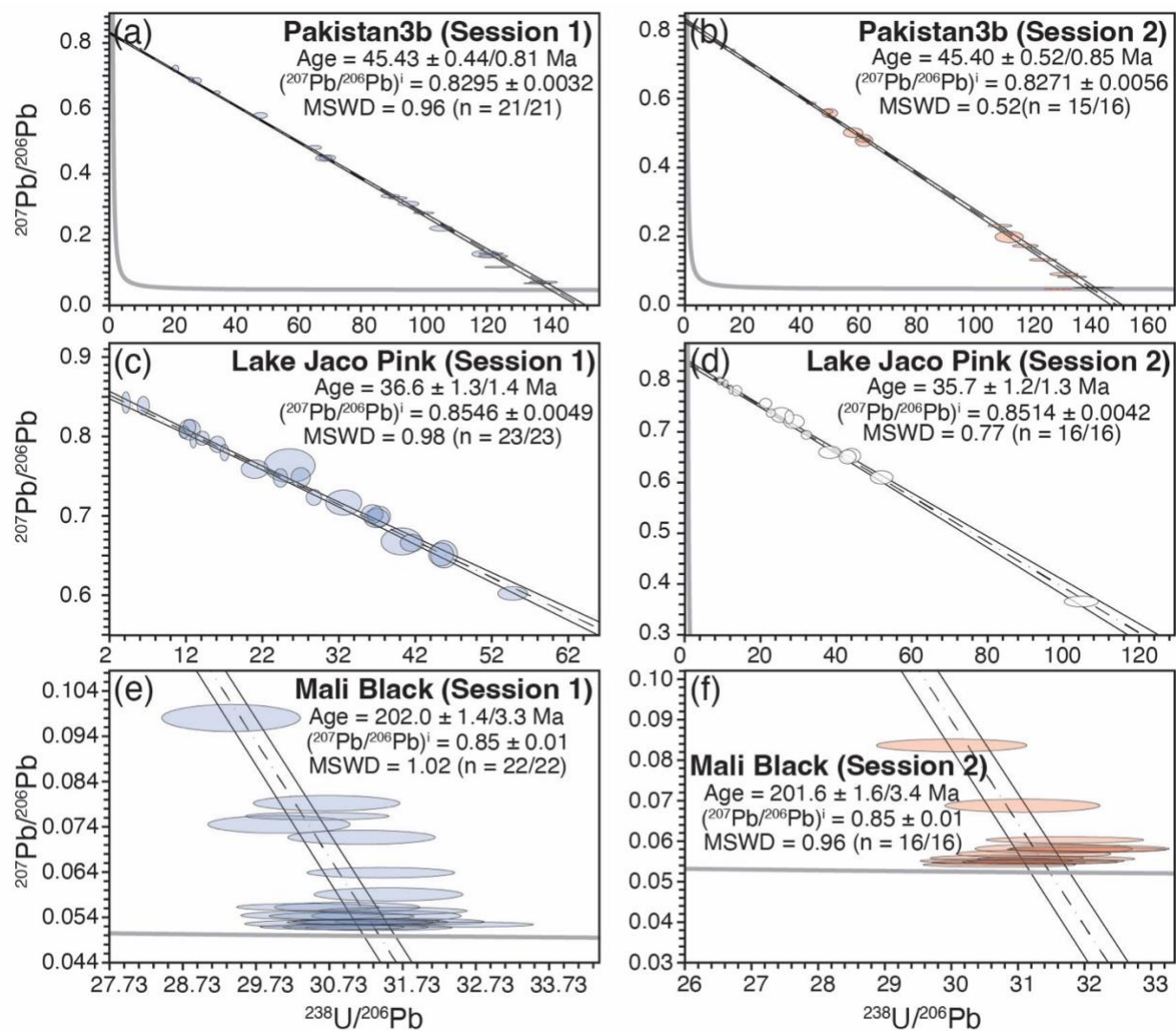
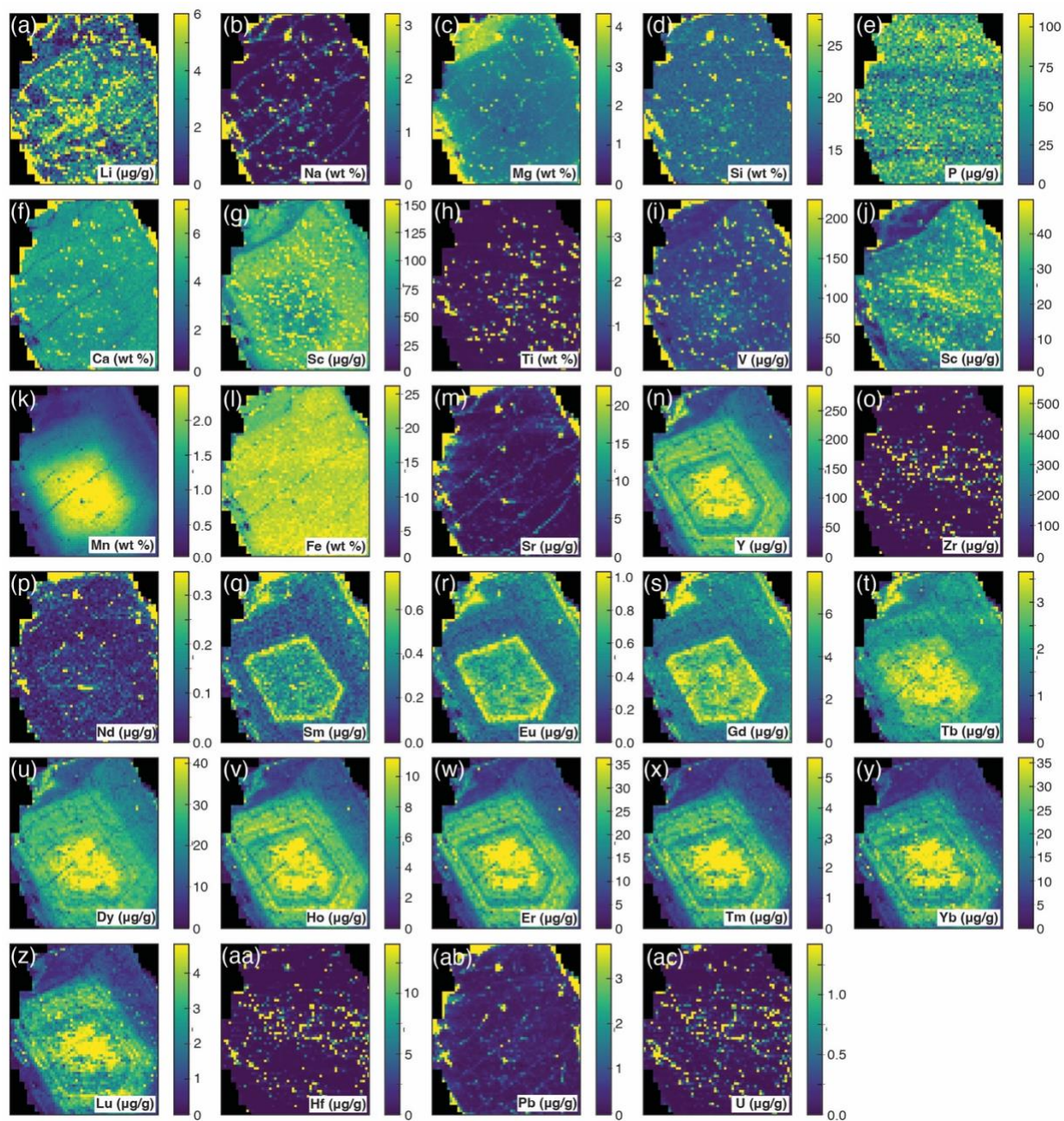


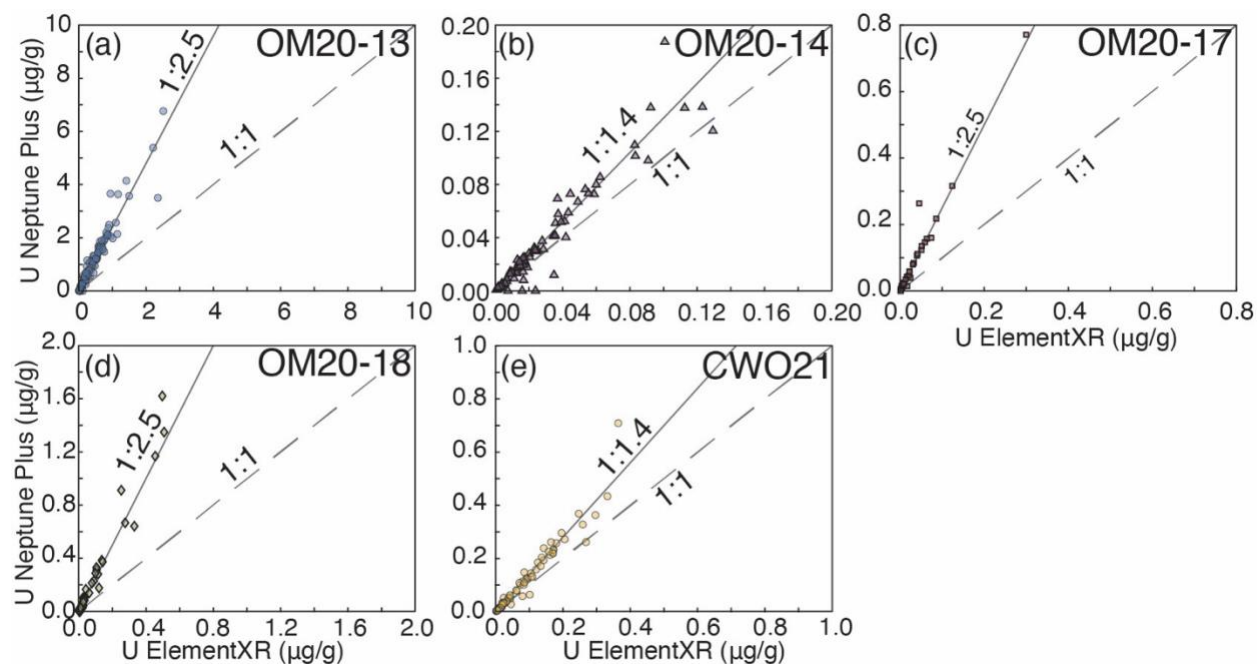
**Figure S1:** Plots of EPMA transects showing garnet endmember fractions for samples (a) OM20-13, (b) OM20-17, and (c) OM20-18. The plots were produced using MinPlotX (Walters, 2022; Walters and Gies, 2024).



**Figure S2:** Tera Wasserburg diagrams for garnet reference materials (a, b) Pakistan 3b, (c, d) Lake Jaco Pink, and (e, f) Mali garnet. Mali garnet analyses were used to calculate offset factors which were applied to all  $^{206}\text{Pb}/^{238}\text{U}$  ratios, whereas Pakistan 3b and Lake Jaco Pink were used as validation materials (see Section 4.3).



**Figure S3:** LA-ICPMS maps for all measured elements (see methods in Section 4.5).



**Figure S4:** Comparison of LASS-ICPMS U contents measured using the Neptune Plus multi-collector instrument and processed using the U-Pb data reduction software compared to Element XR single collector data processed in LADR. Samples OM20-13, OM20-17, and OM20-18 were measured in Session 1, whereas OM20-14 and CWO21 were measured in Session 2. Data from Session 1 show a larger offset from the 1:1 line compared to Session 2.