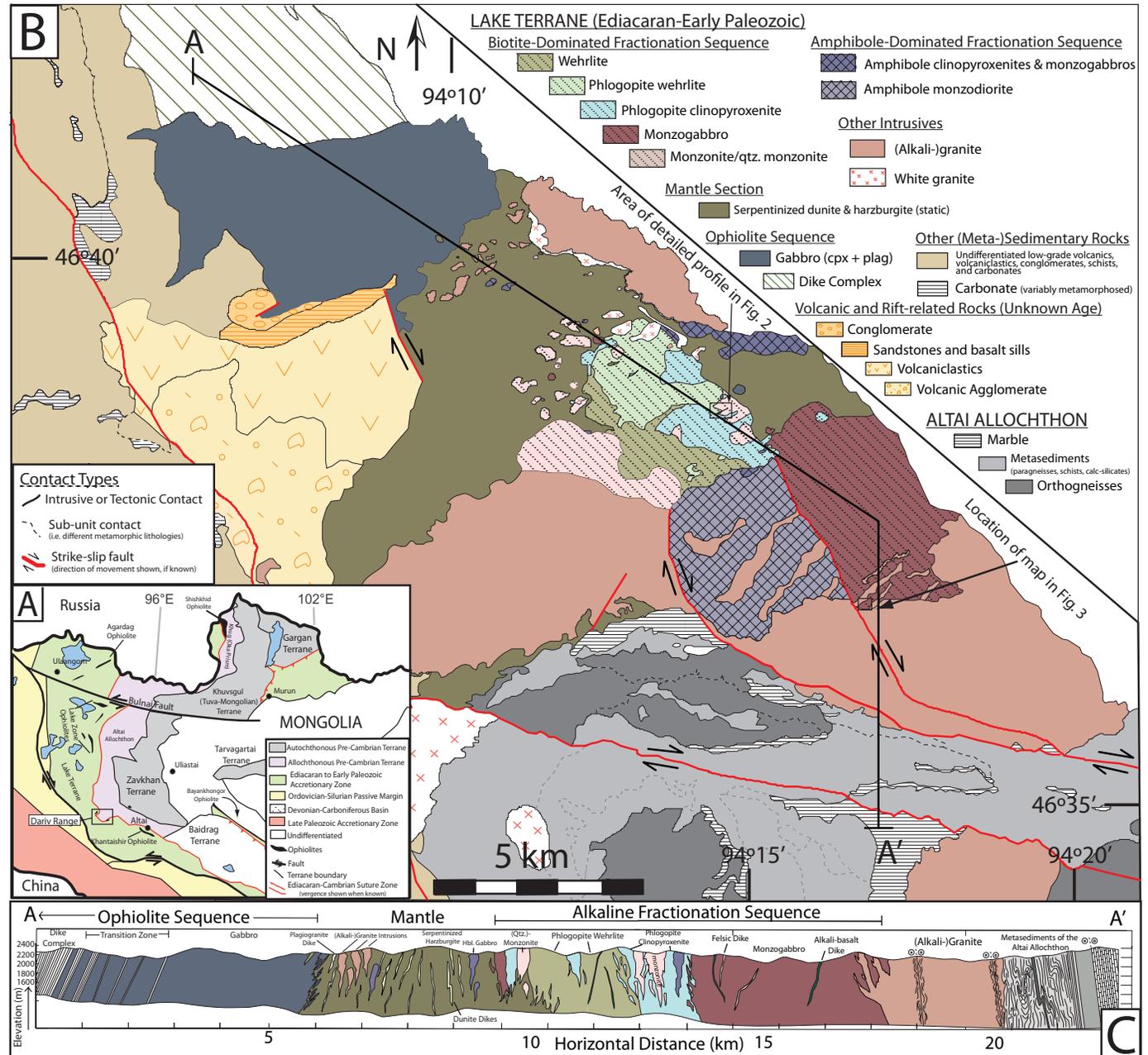


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FIELD RELATIONSHIPS

Fig. 1: Same as Figure 1 in manuscript, but included here to show locations of Fig. 2 and 3 in the supplementary material.



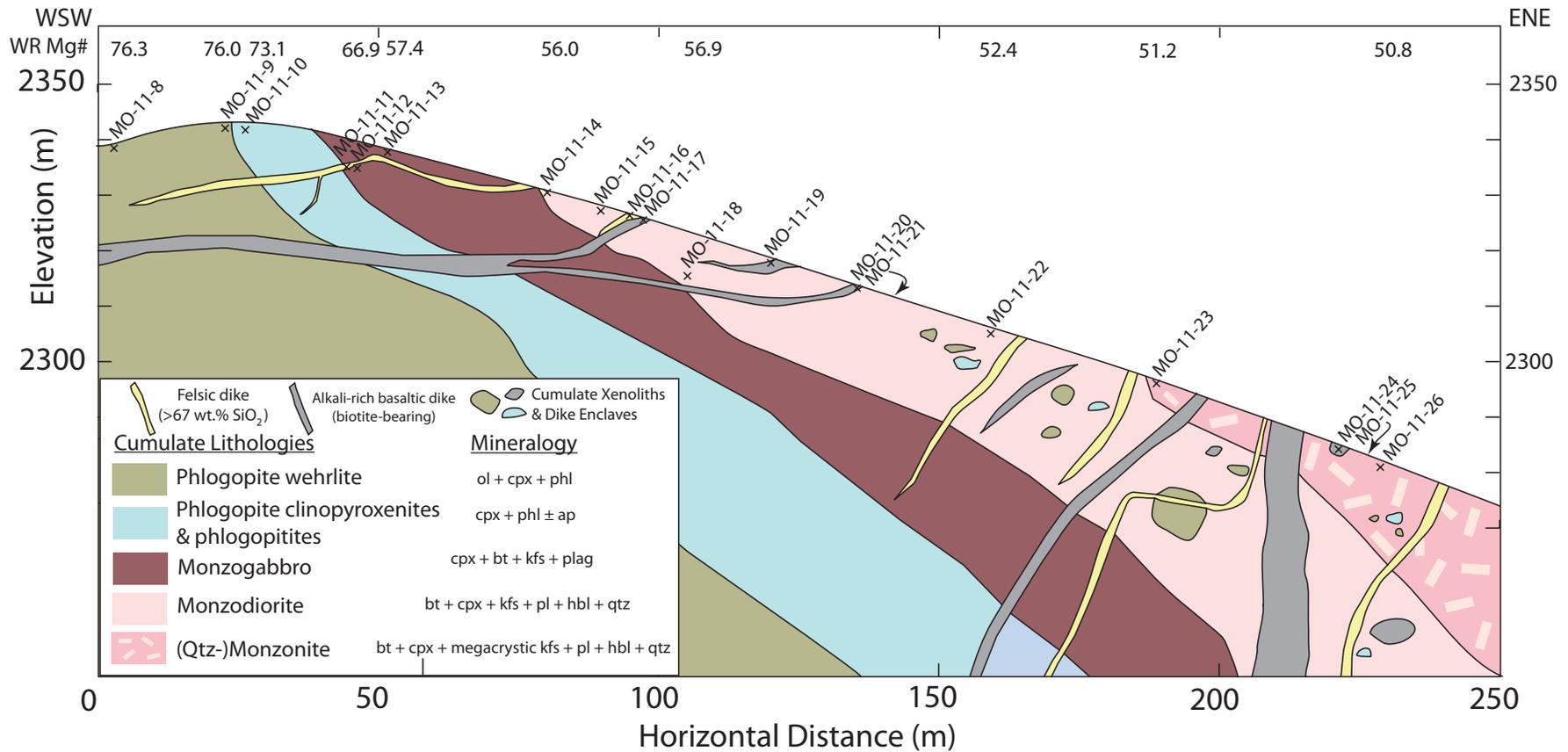


Fig. 2: Detailed WSW-ENE cross-section across biotite-dominated fractionation sequence with sample locations indicated (MO-11-XX). Location of cross section is indicated in Fig. 1. Whole rock Mg#'s (molar $Mg/(Mg+Fe^T) \times 100$) corresponding to distance along profile are given at top of figure. Lithologies become more evolved from left to right, starting with phlogopite wehrlites and grading into clinopyroxene-bearing monzonites. Contacts are drawn as sharp lines for clarity, but boundaries between lithologies are gradational. Profile location is indicated in Fig. 1b. Mineral abbreviations: ol – olivine, cpx – clinopyroxene, phl – phlogopite, ap – apatite, bt – biotite, ksp – K-feldspar, pl – plagioclase, hbl – hornblende, qtz – quartz.

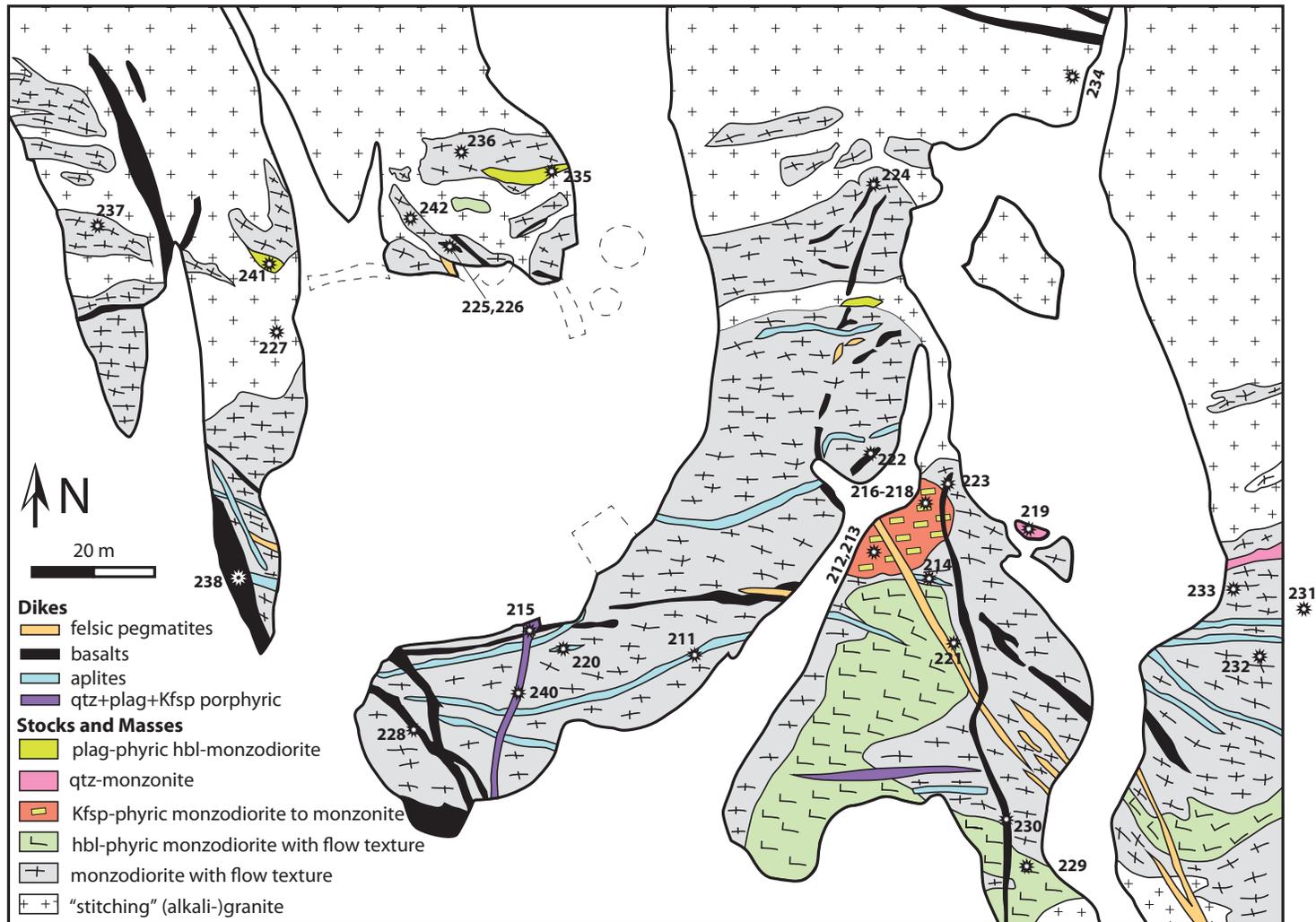


Fig. 3: Detailed study area of feldspar-bearing lithologies of the amphibole-dominated fractionation sequence. Location of map is indicated in Fig. 1. Sample locations are indicated by stars and numbers. The samples names are "MO-9-" followed by the number indicated on the map. Dashed lines indicate stone structures (i.e., ger (yurt) bases or goat corrals) of local herders. Intrusive relationships are described in the text. Monzodiorites and monzonites with amphiboles aligned due to magmatic flow are the predominant lithologies. These bodies are cross-cut by K-feldspar- and plagioclase-porphyric diorites to monzonites and numerous dikes, including felsic pegmatites, aplites, K-feldspar-plagioclase-quartz-porphyric felsic dikes, and basalts, which are mostly oriented E-W or NW-SE. Although cross-cutting relationships between the different dikes are complex in the field, it seems that the felsic and pegmatitic dikes are the oldest intrusions as they are cross cut by the basaltic and K-feldspar porphyric series. Lastly, a large body of (alkali-)granite intrudes the entire sequence.