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Appendix J-1 Histogram of the  $K_D^{\text{oliv-liq}} (= (X_{\text{MgO}}^{\text{oliv}}/X_{\text{FeO}}^{\text{oliv}})/(X_{\text{MgO}}^{\text{liq}}/X_{\text{FeO}}^{\text{liq}}))$  for 108 hydrous olivine-melt equilibrium experiments from the literature where oxygen fugacity was buffered or known (Almeev et al., 2007; Médard and Grove, 2008; Moore and Carmichael, 1998; Parman et al., 2011; Richter and Carmichael, 1996; Sisson and Grove, 1993a; Sisson and Grove, 1993b; Wagner et al., 1995). The  $\text{Fe}^{3+}/\text{Fe}^{2+}$  ratio in each experimental melt was calculated from the model of Jayasuriya et al. (2004; their Eq. 12) based on reported temperature, oxygen fugacity, and melt composition. The average  $K_D$  value of these 108 experiments is  $0.37 \pm 0.04$  ( $1\sigma$ ), which is higher than the average value of 0.34 from anhydrous olivine-melt experiments (Matzen et al., 2011).

