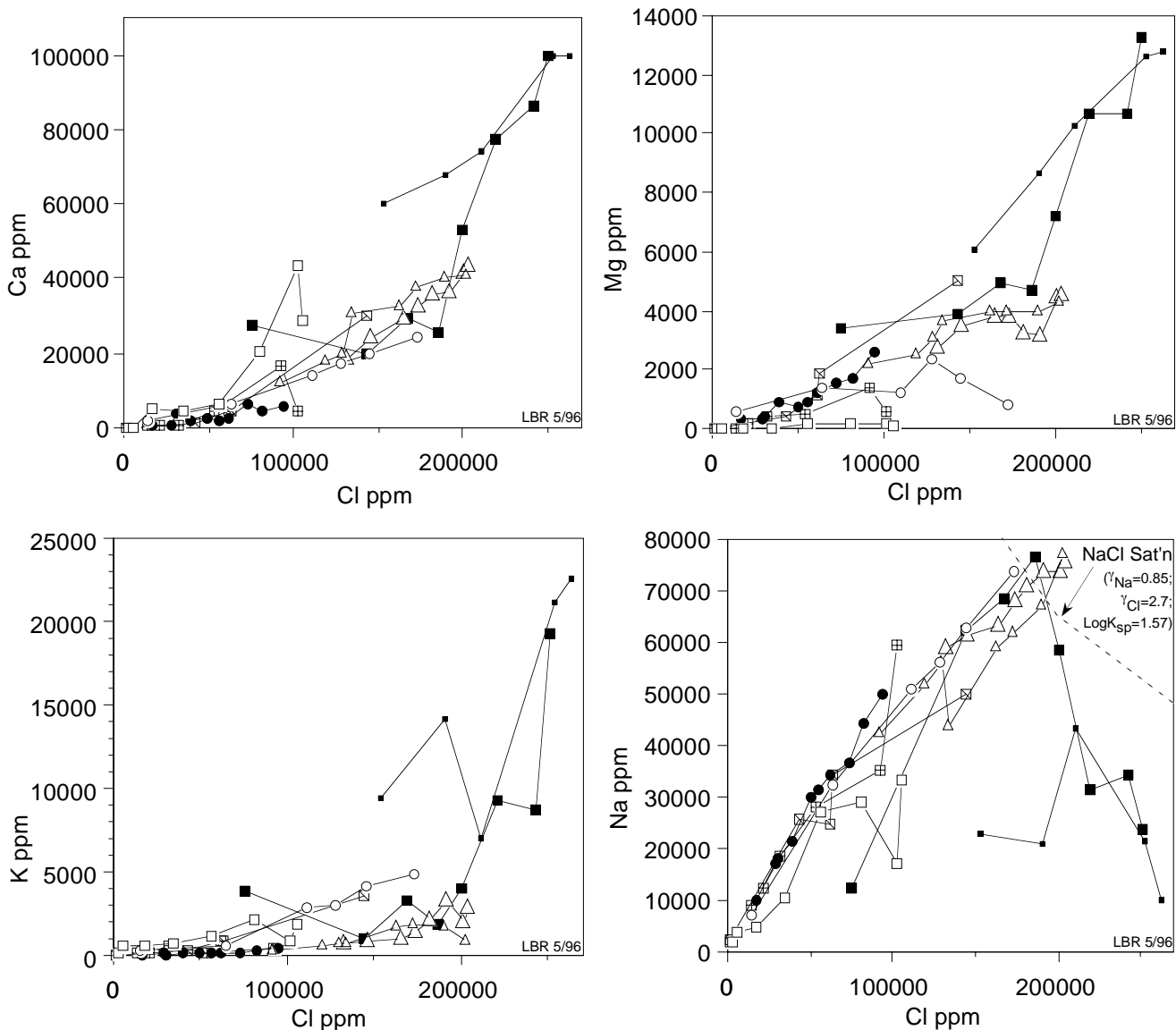


Deep-basin brines II: Variation in major cations

Deep-basin brines are rich in the four cations common in all groundwaters: Ca^{2+} , Mg^{2+} , Na^+ and K^+ . The concentrations of all four generally increase with Cl^- concentration, as is evident below.

With that said, one should note two things. First, the differing vertical scales of the plots below show that the concentration of Ca^{2+} increases far beyond that of the other three major cations (a thought to which we will return in Part III of this series). Secondly, the concentration of Na^+ reaches a peak and then diminishes with increasing Cl^- concentration. That reversal takes place where the concentrations of Na^+ and Cl^- reach saturation with respect to halite. Beyond that point, the requirement that the product of Na^+ concentration and Cl^- concentration remain a constant (the K_{sp} for halite) means that, as Cl^- concentration increases, Na^+ concentration must decrease.



Data are from sedimentary basins in the U.S., Canada, and the North Sea. The legend for the symbols is shown on "Deep-basin brines I: Density, TDS, and chloride".