New data for solid-solution equilibria of the quinary seawater system

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The data of the quinary system Na_2Cl_2-K_2Cl_2-$MgCl_2$-Na_2SO_4-K_2SO_4-$MgSO_4$-H_2O are a necessary requirement for any geochemical modelling of the primary formation of marine evaporites and their subsequent diagenetic and metamorphic alteration (Braitsch, 1962; Herrmann, *et al.* 1978; Herrmann, 1979). Current models are based on the data given by D'Ans (1933) and Autenrieth (1955), in general.

New solubility experiments show however that there are substantial differences between the new results and earlier findings. Thus, 11 new invariant points have been established within the temperature range between 2° and 108°C, and at saturation with respect to halite. Out of the former points a number of 13 has been discarded, and revised data have elaborated for the still valid points, as well as for the 15°, 25°, 35°, 55°, 69°, and 78°C isotherms of the above system.

The latter 2 isotherms which comprise the geochemically important mineral assemblages

carnallite + kainite + kieserite + sylvite + halite

and

kainite + langbeinite + kieserite + sylvite + halite

are replacing the former 72° and 83°C isotherms. Considering the new data base it appears that current geochemical models have to be revised. Examples are given for a number of important reactions which occur in the course of thermal and solution metamorphism of marine evaporites.

References

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