Effect of concentration-dilution cycle on the variation in $\delta^{37}Cl$ values in evaporites

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The chlorine isotopic ratios have been thought to be having a good correlation with the salt lake concentration-dilution cycle, which was supported by many natural evaporites sequences. However, the degree to which the dilution process will affect $\delta^{37}Cl$ is also not known clearly. Here concentration-dilution experiments of brine have been conducted. We present chlorine isotope data of salt and brine that reflect the cycle of brine evolution process. From the results we find a close relationship between the evaporation degree and the $\delta^{37}Cl$ value: during intervals of concentration process the $\delta^{37}Cl$ of brine is decreasing from 0.09‰ to -0.84‰ with evaporation degree falling to 0.25 from 1, reflecting ^{37}Cl have been enriched in salts; during intervals of concentration the $\delta^{37}Cl$ is rising from -0.84‰ to -0.26‰ with evaporation degree ranging from 0.25 to 0.42, reflecting more ^{37}Cl transferring into the brine from the salts. It is indicated that the extent of variation in $\delta^{37}Cl$ of this two processes is different. The same variation in volume of dilution process will have larger effect on $\delta^{37}Cl$ than that of concentration process. These data confirm that ^{37}Cl released from salts can push the brine $\delta^{37}Cl$ rising, and demonstrate that $\delta^{37}Cl$ is a good proxy to trace salts precipitated stage in concentration-dilution cycle.