Recent observations and experimental modeling have suggested that flow features such as gullies [1], slope streaks [2] and more recently recurrent lobe lineae [3] are still active on the surface of Mars and could result from the activity of highly concentrated brines [2,4]. Indeed, pure water is not stable on the surface of Mars (Fig. 1). Dissolved salts can indeed reduce the freezing temperature of the solutions, as well as their freezing rate [5,6]. Moreover, recent models have shown that melting of ice-salt mixtures can result in enough brine to account for the recently observed flow features [4].

Abundant salts have been observed on the surface of Mars, ranging from sulfates [7] to chlorides [8] to perchlorates [9]. All these phases have the potential for creating liquid brines on the surface of Mars [5,10,11]. This presentation covers the stability of liquid brines on the surface of Mars with respect to freezing, evaporation, boiling and deliquescence.