## Supplementary material

Results of rheometry

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In total, seventeen aqueous bentonite suspensions, which differ in salt content, were used as model liquids. The suspensions contain bentonite in the fixed ratio to the binary (deionized water and salt) mixture. All suspensions exhibit strong non-Newtonian behavior. The measured values of viscosity are presented in Figure S2. It is seen there that in the measured ranges of shear rates, the significant discrepancy occurs for individual salt types as well as for their concentration within the mixture. All salt suspensions are characterized by the smaller viscosity than the salt-free bentonite mixture which has ~1 - 8 Pa.s within one order of decreased shear rate, and static yield stress 87 ± 4 Pa. The largest difference in the viscosity occurs for increasing concentrations of the Na<sub>2</sub>SO<sub>4</sub> (~0.05 - 0.4 Pa.s for the maximum shear rate of 60 s<sup>-1</sup> and ~0.2 - 4 Pa.s for the minimum shear rate of 10 s<sup>-1</sup>). The rest of the salts, including the mixtures (Na-based + Mg-based salt), has even smaller viscosities and their difference with increasing concentration is smaller than for the Na<sub>2</sub>SO<sub>4</sub>. Typical range is ~0.009 - 0.1 Pa.s with shear rate decreasing in range of ~260 - 10 s<sup>-1</sup>. All the remaining salts also show the non-linear viscosity dependence on concentration with typical viscosity drop with increased concentration, followed by rapid increase for the highest concentration. Typical example is the NaCl which (for the minimum shear rate 10 s<sup>-1</sup>) exhibits a drop to 0.09 Pa.s for increased salinity to 2.5 wt.% concentration, followed by an increase up to 0.2 Pa.s for the 10 wt.% concentration. Associated parameters of the power-law models are shown in the bottom part of Figure S2. Datasets including the rheometry data are available on request.

#### Molecular processes - detailed

Nowadays, the anti-freezing of aqueous salt solutions is understood on a molecular level<sup>1</sup>. Even aqueous bentonite suspensions freeze at lower temperatures than water alone and these suspensions display the following trends: a) with a lower water content, there is a lower freezing point, and b) with a lower bentonite density, there is a lower freezing point<sup>2</sup>. Addition of salt rapidly decreases freezing point in coarse-grained frozen soils where higher salt concentration results in higher content of unfrozen water between ice crystals<sup>3</sup>. In our flow experiments, this is one of the effects that supports mud mobility due to increased content of liquid water content with respect to clay and therefore preserves a larger portion of the liquid mud within the flow (see Fig. S4a in *Supplementary material* for liquid fractions). Moreover, pore-confined water freezing either of pure water or NaCl solutions leads to large shift of

freezing point (comparing three freezing points in bulk vs in pores of size 6.5 nm for water and 3% NaCl solution: 0 °C vs -14.44°C and -4.39 °C vs -36.96°C respectively)<sup>4</sup>. The eutectic temperature for pore-confined water freezing depends on the salt composition and concentration but it is always lower than that for bulk solution<sup>5</sup>. Therefore, a synergy effect can be supposed in the case of bentonite muds, i.e. decreasing of freezing temperature both due to salt addition and pore-confined water freezing inside the card house structure of bentonite particles (Fig. 5). Rearrangement of acting van der Waals forces in between molecules of clay sheets, ice and salt crystals will progressively change macroscopic bulk properties, leading to the experimentally documented behavior (Fig. 5a,b).

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It is also known that salt in an aqueous clay suspension serves as an additive which strongly influences electrochemical interactions between clay particles and therefore stability and flowability of these suspensions. Furthermore, the suspension stability depends on the clay itself (e.g. Na-bentonite is more stable than Ca-bentonite) and this can be either adjusted by various salt content<sup>6</sup>. The absolute value of zeta(electrical)-potential corresponding to the stability of bentonite suspensions increases with the type of salt as follows KCl < LiCl < NaCl < Na<sub>2</sub>SO<sub>4</sub><sup>7</sup>. The formation of an electrical double layer which is responsible for electrochemical interactions between bentonite particles and therefore bentonite suspension stability is studied in detail by molecular simulations<sup>8,9</sup>. In our experiments and theoretical calculations, this chain of stability is macroscopically confirmed and thus can explain the increased mobility with certain salt concentrations (Fig. 5a). The flowability is typically adjusted if a salt is added in between the montmorillonite tetrahedrons, forming the diffuse layer. Viscosity of bentonite (montmorillonite) suspensions decreases with increasing concentration either of an acid or its salt up to critical coagulation concentration and then sharply increases with further salt addition<sup>10</sup> (Fig. 5a, Fig. 4d, Fig. S2). Specifically, NaCl addition can reduce viscosity of bentonite suspensions to about 30% for 0.1M NaCl and to 5% for 1M NaCl<sup>10-12</sup>. The same level of viscosity reduction was observed for addition of Na<sub>2</sub>SO<sub>4</sub> (see also the measured rheological properties at Fig. 4d, Fig. S2) and even stronger viscosity reduction in the case of KCl, CaCl<sub>2</sub> and BaCl<sub>2</sub> addition<sup>12</sup>. Our flow experiments then reflect this salt-caused mud viscosity reduction by showing increased mobility and spatially more distributed flows with a more simple morphology of the surfaces (compare Fig. 3f with the Fig. 3h,i). The role of sulfates in cation exchange reactions has recently been investigated within the context of the Martian environment<sup>13</sup>, alongside studies on the kinetics of brine formation and its significance in relation to deliquescence periods on Mars<sup>14</sup>.

#### Mudflow temporal bulk evolution

Our experimental setup cannot provide any information about the internal changes in the composition nor the temperature gradients throughout the flow, however, we speculate that the fast pressure drop can result in non-equilibrium processes. The relative effects of different salts in experimental solutions, on the other hand, are reasonably well predicted by calculated phase equilibria (Fig. 4c). One of the problematic features is the loss of water from the system due to the evaporation from the mixture during the pressure drop. Progressive reduction of the water content through evaporation drives evaporative cooling and affects the bulk composition and hence changes the density-viscosity of the mud. Additionally, once the freezing point is reached and ice forms, salts are rejected into residual brine, creating an ice-brine slurry that varies in its ice content across different salts and salinities (Supplementary Fig. S4). Following the evaporation sequence, this process changes the bulk composition and results in an increased salinity of the whole mixture. Finally, the crystal nucleation process is associated with release of latent heat which can locally contribute to mud temperature (see also local peaks at Figure 4a,b). As the mud (brine) flows, these coupled effects can a) accelerate or slow the cooling and b) influence the mechanical flow properties from the extrusion point and throughout the mud flow. For example, a decreased mud mobility (i.e. velocity) can accelerate the process of the clay-ice crust formation without stalling the flow. In the flows where the lobeeffusion propagation cycles are expected, the internal portions of a "relaxed" liquid mud are immediately exposed to low-pressure again. This mud can then undergo a new cycle with completely different properties that results from all the previous compositional changes. It is also important to note that salt combinations or different clays will impact accordingly on mud cooling and flow properties. For example, different clay-water ratios can lead to mud-lobes inflation as recently proved and quantified by Brož et al. 15. We can hypothesize that in such cases the process of their depressurization can lead to a completely different thermodynamic cycle and to crystallization of new salts which will influence in multiple ways the flow properties.

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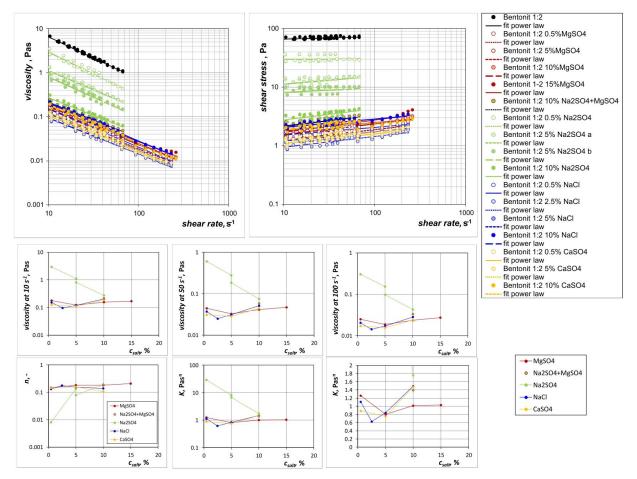


Fig. S2: Results of the rheometry performed on the bentonite suspensions. Multiple rheology parameters, including viscosity and shear rate dependences which are shown in simplified form at figure 4. Further diagrams show measured viscosity-concentration dependence for 3 different tested shear rates (10-100 Pa.s), carrying flow index (n) and coefficient of consistency (K) for various concentrations of tested suspension. Diagrams showing consistency factors are split due to high logarithmic variation. Shown are also salt-combined suspensions.

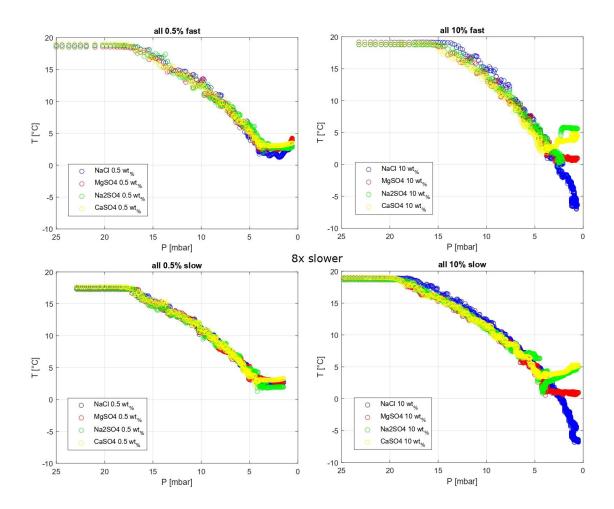
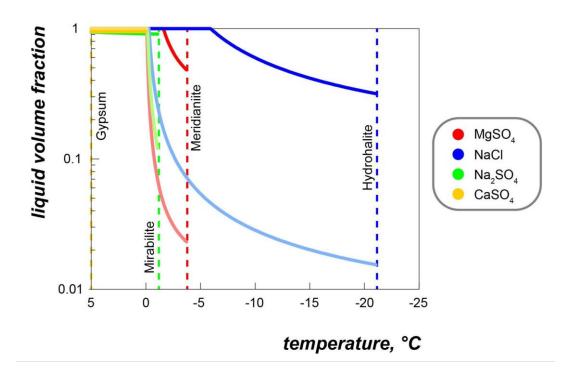


Fig. S3: Comparison of the p-T paths from the fast and slow experiments - for the low concentration (exp11 and exp26) and for the high concentration (exp10 and exp20). Well visible are the increased discrepancies and more perturbed trends for the fast pressure drop while the slow pressure drop is characterized by more stable paths. Boiling point occurs at ~5-7 mbar lower pressures for the increased concentrations, with respect to slow and fast rate of the pressure drop. The terminal temperatures, associated with freezing in the upper level of a column, are lower for the higher concentrations and slow depressurization.



113 Fig. S4: Temperature-dependent volume fraction of individual salts provided by thermodynamic 114 calculations. The color saturation corresponds to salt concentration (light - 0.5 wt%, dark - 10 wt%). The 115 NaCl solution represents a system with the highest liquid volume portion kept for the lowest 116 temperatures. Crystallization terminal (eutectic) temperatures where solid phase assemblages being 117 formed are marked by dashed lines. Individual salts are hydrohalite (NaCl.2H<sub>2</sub>O), meridianiite 118 (MgSO<sub>4</sub>.11H<sub>2</sub>O), mirabilite (Na<sub>2</sub>SO<sub>4</sub>.10H<sub>2</sub>O) and gypsum (CaSO<sub>4</sub>.2H<sub>2</sub>O) for NaCl, MgSO<sub>4</sub>, Na<sub>2</sub>SO<sub>4</sub> and 119 CaSO<sub>4</sub> solutions, respectively. Dilute solutions (0.5 wt%) show negligible predicted deviations from pure 120 H<sub>2</sub>O, with freezing point depressions of <1 °C and decrease in saturation vapor pressure of <0.07 mbar 121 at 20 °C (Tab, S3). The greatest influence on phase equilibria is exerted by 10 wt.% for NaCl, MgSO4

and Na<sub>2</sub>SO<sub>4</sub>, with freezing point depressions of -5.9, -1.7 and -1.7 °C and saturation vapor pressure

decreases relative to pure H<sub>2</sub>O of 1.36, 0.36 and 0.58 mbar at 20 °C, respectively.

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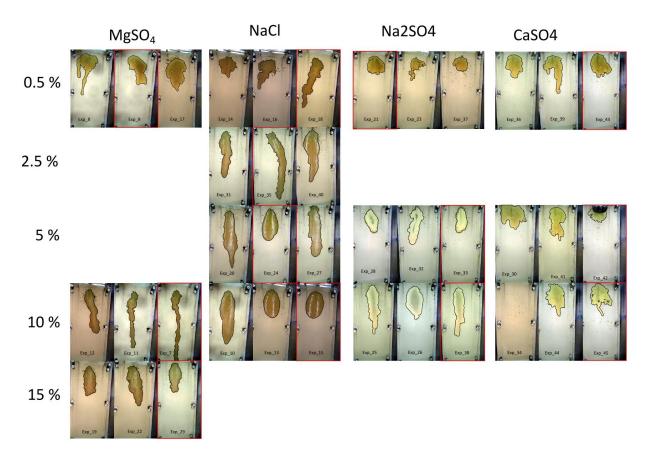


Fig. S5: Resultant shapes of all flow experiments (excluding salt mixtures), shown in the grid of salts and their concentrations.

Tab. S1: Overview of the (mud flow) experimental data.

Exp #	Pressure range [mbar]	Salt *	Concentration [% w/w] **	Mud temperature [°C] * * *	Surface Temperature [°C]	Release time [s] ****	Included in main analysis	Cooling exp. counterpart *5	Flow type stream/length/surface/speed
7	4.5 (6.0) - 5.9 (7.4)	MgSO <sub>4</sub>	10	18.85/-1.15	-23	56	yes	yes	narrow/long/ropy/slow
8	4.6 (6.1) - 5.7 (7.2)	MgSO	0.5	18.90/-0.15	-26	40	yes	yes	multiple/short/lobes/very slow
9	4.7 (6.2) - 5.6 (7.1)	MgSO,	0.5	19.85/-0.16	-17	41	yes	yes	multiple/short/lobes/very slow
10	4.5 (6.0) - 5.8 (7.3)	NaCl	10	18.80/0.85	-25	37	yes	yes	wide/average/flat/medium
11	4.8 (6.3) - 5.9 (7.4)	MgSO <sub>4</sub>	10	17.80/-0.10	-23	47	yes	yes	narrow/long/ropy/slow
12	4.6 (6.1) - 5.8 (7.4)	MgSO <sub>4</sub>	10	19.80/-1.15	-22	37	yes	yes	narrow/average/ropy/slow
13	4.3 (5.8) - 5.7 (7.1)	NaCl	10	18.85/-1.17	-27	40	yes	yes	very wide/short/flat/very slow
14	4.6 (6.1) - 5.8 (7.4)	NaCl	0.5	19.90/-0.10	-29	27	yes	yes	wide/very short/lobe/very slow
15	4.6 (6.1) - 5.8 (7.4)	NaCl	10	20.65/2.65	-16	44	yes	yes	circular/short/flat/very slow
16	4.5 (6.0) - 5.8 (7.3)	NaCl	0.5	20.60/-1.15	-23	36	yes	yes	multiple/short/lobes/slow
17	4.5 (6.0) - 5.8 (7.3)	MgSO <sub>4</sub>	0.5	20.75/0.05	-23	41	yes	yes	multiple/short/lobes/slow
18	4.6 (6.1) - 5.8 (7.4)	NaCl	0.5	19.85/-0.15	-12	40	yes	yes	narrow/average/lobes/slow
19	4.3 (5.8) - 5.7 (7.1)	MgSO	15	19.90/-1.05	-23	35	yes	no	short/wide/flat/very slow
20	4.7 (6.2) - 5.8 (7.3)	NaCl	5	19.80/-1.20	-22	42	yes	yes	long/wide/flat/fast
21	4.6 (6.1) - 5.8 (7.4)	Na ,SO,	0.5	19.85/0.85	-18	20	yes	yes	circular/very short/lobe/very slov
22	4.5 (6.0) - 5.8 (7.3)	MgSO <sub>4</sub>	15	19.85/-1.10	-26	34	yes	no	wide/average/flat/slow
23	4.6 (6.1) - 5.8 (7.4)	Na ,SO <sub>4</sub>	0.5	19.80/1.80	-19	25	yes	yes	multiple/very short/lobes/very slo
24	4.5 (6.0) - 5.8 (7.3)	NaCl	5	19.90/1.85	-20	39	yes	yes	wide/average/flat/medium
25	4.6 (6.1) - 5.8 (7.3)	Na ,SO <sub>4</sub>	10	19.90/3.80	-21	35	yes	yes	wide/average/flat/medium
26	4.5 (6.0) - 5.9 (7.4)	Na <sub>2</sub> SO <sub>4</sub>	10	18.90/3.90	-23	28	yes	ves	wide/short/flat/medium
27	4.5 (6.0) - 5.8 (7.3)	NaCl	5	19.85/-1.35	-31	37	yes	yes	wide/avarage/flat/medium
28	4.5 (6.0) - 5.8 (7.3)	Na <sub>2</sub> SO <sub>4</sub>	5	20.55/-1.15	-19	30	yes	yes	circular/short/flat/very slow
29	4.5 (6.0) - 5.8 (7.3)	Na <sub>2</sub> SO <sub>4</sub>	15	20.85/1.90	-23	28	yes	no	wide/short/flat/slow
30	4.6 (6.1) - 5.8 (7.3)	CaSO,	5	20.75/0.60	-26	25	yes	yes	multiple/very short/lobes/very slo
31	4.6 (6.1) - 5.8 (7.3)	NaCl	2.5	20.50/-2.15	-24	37	yes	ves	narrow/long/ropy/medium
32	4.5 (6.0) - 5.9 (7.4)	Na ,SO,	5	20.90/1.75	-22	30	yes	yes	wide/average/ropy/medium
33	4.5 (6.0) - 5.8 (7.3)	Na <sub>2</sub> SO <sub>4</sub>	5	20.85/-0.20	-24	38	yes	yes	circular/short/ropy/slow
34	4.4 (5.9) - 5.0 (6.5)	CaSO <sub>4</sub>	10	20.85/1.05	-23	failed exp.	no	yes	N/A
35	4.5 (6.0) - 5.8 (7.3)	NaCl	2.5	20.65/1.00	-19	55	yes	yes	average/very long/ropy/fast
36	4.4 (5.9) - 5.8 (7.3)	CaSO	0.5	19.90/0.95	-25	20	yes	yes	multiple/very short/lobes/very slo
37	4.5 (6.0) - 5.8 (7.3)	Na <sub>2</sub> SO <sub>4</sub>	0.5	19.90/-0.20	-22	26	yes	ves	circular/very short/lobe/very slov
38	4.5 (6.0) - 5.8 (7.3)	Na ,SO <sub>4</sub>	10	20.50/-1.30	-19	40	yes	yes	average/long/flat/medium
39	4.4 (5.9) - 5.9 (7.4)	CaSO <sub>4</sub>	0.5	20.50/-0.15	-33	25	yes	yes	multiple/short/lobes/slow
40	4.5 (6.0) - 5.8 (7.3)	NaCl	2.5	20.50/0.95	-28	40	yes	yes	wide/average/flat/medium
41	4.6 (6.1) - 5.8 (7.3)	CaSO <sub>4</sub>	5	20.85/0.80	-21	25	yes	yes	multpile/short/lobes/slow
42	4.5 (6.0) - 5.8 (7.3)	CaSO <sub>4</sub>	5	20.75/0.80	-22	26	yes	yes	multiple/very short/lobes/very slo
43	4.5 (6.0) - 5.8 (7.3)	CaSO <sub>4</sub>	0.5	19.80/-0.15	-22	30	yes	yes	multiple/very short/lobes/very slo
44	4.6 (6.1) - 5.8 (7.3)		10	19.85/0.75	-26	25	yes	yes	multiple/short/lobes/very slow
45	4.6 (6.1) - 5.8 (7.3)	CaSO <sub>4</sub>	10	19.85/0.80	-27	24			multiple/short/lobes/very slow
46	4.6 (6.1) - 5.8 (7.3)	CaSO <sub>4</sub>	15	20.80/-0.20	-27	23	yes no	yes no	wide/short/flat/slow
		Na 2SO4	15			43			
47 48	4.5 (6.0) - 5.8 (7.3)	MgSO <sub>4</sub>	10	19.95/0.85	-24		no	no	narrow/long/ropy/medium
48	4.5 (6.0) - 5.8 (7.3)	CaSO <sub>4</sub>	5	20.45/0.80	-16	30	no	yes	multiple/short/lobes/slow
49 50	4.4 (5.9) - 5.9 (7.4)	MgSO <sub>4</sub> + Na,SO <sub>4</sub>	10	19.50/-0.35 19.65/0.65	-29 -30	27 18	no	yes	average/average/ropy/medium
	4.5 (6.0) - 5.8 (7.3)	CaSO <sub>4</sub>		32			yes	yes	multiple/short/lobes/slow
51	4.5 (6.0) - 5.8 (7.3)	MgSO <sub>4</sub> + Na,SO <sub>4</sub>	10	19.60/-0.20	-27 -25	30	no	yes	wide/long/flat/fast
52	4.4 (5.9) - 5.8 (7.3)	NaCI + Na <sub>2</sub> SO <sub>4</sub>	5	18.75/-0.15		42	no	yes	narrow/very long/ropy/fast
53	4.5 (6.0) - 5.8 (7.3)	MgSO <sub>4</sub>	5	20.25/-1.20	-25	40	yes	yes	narrow/very long/lobes/fast
54	4.5 (6.0) - 5.8 (7.3)	MgSO <sub>4</sub>	5	20.35/0.95	-23	35	yes	yes	multpile/very long/lobes/fast
55	4.3 (5.8) - 5.8 (7.3)	MgSO <sub>4</sub>	5	19.70/1.00	-21	32	yes	yes	narrow/long/lobes/fast

<sup>\*</sup> Salt combinations werere prepared in the ratio 1:1 (w/w)

<sup>\*\*</sup>Set to minimations werere prepared in the fatio 1.1 (w/w)

\*\*Exp #46-#48 were prepared with using of a same volume of the pre-prepared salt binars instead of weight fraction (to test the effect of a different water content)

\*\*\*\* Approximate temperature within the container before/after the pressure drop (at a moment of release)

\*\*\*\* Time period of the mud release from the container

\*\*\* Existence of the cooling experiment with the same salt-water concentration

\*6 Exps. marked by italic have stored movies in the supplementary materials (corresponding to images on Figure 2 and 3)

144 Tab. S2: Overview of the (tube cooling) experimental data.

	freezing (mekar) **/	1	Evn #	ate S												
sixt         firt         12         NeG         6.0         13         0.0         13.44,44.56         90.00,200,10.11         90.00         90.00,200,10.11         90.00         90.00,200,10.11         90.00         90.00,200,10.11         90.00         90.00,200,10.11         90.00         90.00,200,10.11         90.00	445, 225, 445	445, 225, 445			[mbar]	YIM	[% m/m]	averaged [°C]	difference [°C] **	(a, b, c, d) [s] ***	**** [S]	boiling (mbarl *5	freezing Imbarl *5	3 cm above the bottom I*CI **	main analysis	(main observations)
Heat   Fire   13   Mago,   Os-10   193   Os   104,141,219,   Os   108,131,137   Os   Os   10,131,131,131,131,131,131,131,131,131,1	435, 2.5, 2.6, 0.65  435, 2.5, 2.6, 0.65  435, 2.5, 2.6, 0.65  435, 2.5, 2.6, 0.65  435, 2.5, 2.6, 0.65  435, 2.5, 2.6, 0.65  435, 2.5, 2.6, 0.65  435, 2.6, 2.6, 2.6, 2.6, 2.6, 2.6  437, 2.5, 2.6, 2.6, 2.6, 2.6, 2.6  437, 2.5, 2.6, 2.6, 2.6  43, 2.5, 2.6, 2.6, 2.6  43, 2.5, 2.6, 2.6, 2.6  43, 2.5, 2.6, 2.6, 2.6  43, 2.5, 2.6, 2.6  43, 2.5, 2.6  43, 2.5, 2.6  43, 2.5, 2.6  43, 2.5, 2.6  44, 2.6, 2.6  44, 2.6, 2.6  44, 2.6, 2.6  45, 2.6, 2.6  46, 2.6, 2.6  47, 2.6, 2.6  48, 2.6  48, 2.6, 2.6  48, 2.6	435, 2.5, 2.6, 0.65  435, 2.5, 2.6, 0.65  435, 2.5, 2.6, 0.65  435, 2.5, 2.6, 0.65  435, 2.5, 2.6, 0.65  435, 2.5, 2.6, 0.65  435, 2.5, 1.2, 0.55  435, 1.2, 1.2, 0.55  435, 1.2, 1.2, 0.55  435, 1.2, 1.2, 0.55  435, 1.2, 1.2, 0.55  435, 1.2, 1.2, 0.55  435, 1.2, 1.2, 0.55  435, 1.2, 1.2, 0.55  435, 1.2, 1.2, 1.2, 0.5  435, 1.2, 2.6, 2.2, 1.2, 1.2, 1.2, 1.2  435, 1.2, 2.6, 2.2  435, 1.2, 2.6, 2.2  435, 1.2, 2.6, 2.2  435, 1.2, 2.6, 2.2  435, 1.2, 2.6, 2.2  435, 1.2, 2.6  435, 1.2, 2.6  435, 1.2, 2.6  435, 1.2, 2.6  435, 1.2, 2.6  435, 1.2, 2.6  435, 1.2, 2.7  435, 1.2, 2.	1 8		2.2	NaCl	0.5 - 10	19.22	0.2	140, 143, 145 149	340, 500, 710, 1310		10.40	4.35, -0.15, -2.75, 4.95	yes	a,b,d thin ice lids, c column freezing
sist         first         12         Med         0.5-10         13.5         G1         13.5, 50, 10.3<	445,52.5.0.15 wes  215,525,235,235,015 wes  215,525,245,245,015 wes  215,525,245,125,035 wes  215,225,125,125,035 wes  217,12,6,37 0.05,425,125,135 wes  217,12,6,34 0.05,425,125,135 wes  217,12,6,34 0.05,425,125,135 wes  217,12,24 0.05,425,125,125 wes  217,12,24 0.05,425,125,125 wes  217,12,13,13 0.05,425,125 wes  217,12,13,13 0.05,425,125,125 wes  217,12,13,13 0.05,425,125,125 wes  217,12,13,13 0.05,425,125,125 wes  217,12,13,13 0.05,425,125,125 wes  217,12,13,13 0.05,425,125 wes  217,12,13 0.05,425,125 we	445,52.5.0.15 wes  215,035,236,035 wes  315,035,236,035 wes  315,035,136,135,136,035 wes  317,12,64,37 0.05,425,136,135 wes  317,12,64,37 0.05,425,136,136 wes  317,12,64,37 0.05,425,135,136 wes  317,12,64,44 1.05,425,136,136 wes  317,12,84 6.05,735,136 wes  31,13,2,83 1.05,136,136 wes  31,13,2,84 0.05,735,136,136 wes  31,13,2,3,3 0.05,132,136,136 wes  31,13,2,3,3 0.05,132,132,136 wes  31,13,2,3 0.05,132,132,136 wes  31,13,2,3 0.05,132,132,132 wes  31,13,2,3 0.05,132,132 wes	2 5.		1.2	MgSO <sub>4</sub>	0.5 - 10	19.7	0.4	138, 139, 139, 140	300, 298, 315, 337	¥	90	3.95, 2.75, 2.05, 0.05	yes	ice lids, gradually increased thickness
side         fett         2.1         bid         0.5-10         13.5         0.4         13.5,50.4,50.25         No.         13.5,00.4,50.5         No.           side         fet         1.2         kid         0.5-10         13.2         13.5 <td>2,05,05,205,205,525,959  13,05,205,205,526,959  13,05,205,205,205,959  13,05,205,205,205,959  13,05,205,205,205,959  13,05,205,205,205,205  13,12,6,4,4  12,05,205,205,205,205,205  13,12,2,4,4  12,05,205,205,205,205  13,12,2,4,4  12,05,205,205,205,205  13,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,5  12,13,2,13  12,13</td> <td>2,05,05,205,205,525,955  13,05,205,205,525,955  13,05,205,105,105,105,105,105  13,112,6,37  13,112,6,37  13,13,13,41  13,13,13,13,41  13,13,13,13,13,13,13,13,13,13,13,13,13,1</td> <td>3</td> <td></td> <td>2.3</td> <td>MgSO<sub>4</sub></td> <td>0.5 - 10</td> <td>19.5</td> <td>0.3</td> <td>140, 141, 142, 140</td> <td>297, 309, 327, 315</td> <td>7</td> <td>Ω</td> <td>4.35, 3.25, 2.35, 0.15</td> <td>yes</td> <td>ice lids, gradually increased thickness</td>	2,05,05,205,205,525,959  13,05,205,205,526,959  13,05,205,205,205,959  13,05,205,205,205,959  13,05,205,205,205,959  13,05,205,205,205,205  13,12,6,4,4  12,05,205,205,205,205,205  13,12,2,4,4  12,05,205,205,205,205  13,12,2,4,4  12,05,205,205,205,205  13,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,4  12,12,2,4,5  12,13,2,13  12,13	2,05,05,205,205,525,955  13,05,205,205,525,955  13,05,205,105,105,105,105,105  13,112,6,37  13,112,6,37  13,13,13,41  13,13,13,13,41  13,13,13,13,13,13,13,13,13,13,13,13,13,1	3		2.3	MgSO <sub>4</sub>	0.5 - 10	19.5	0.3	140, 141, 142, 140	297, 309, 327, 315	7	Ω	4.35, 3.25, 2.35, 0.15	yes	ice lids, gradually increased thickness
sit         fat         12         Mod         0.5-10         135, 141, 140, 140         377, 358, 40, 30         37, 358, 358, 30         37, 358, 358, 30         37, 358, 358, 30         37, 358, 358, 30	315, 245, 245, 245, 245, 245, 245, 245, 24	315, 245, 245, 245, 245, 245, 245, 245, 24	4		2.2	NaCl	0.5 - 10	19.35	0.4	138, 140, 142, 145	326, 390, 480, 650	p.	.60	2.65, 0.95, -2.05, -5.25	ves	ice lids, gradually increased thickness
Heat   11   11   11   11   11   11   11	4.25, 1.25, 0.05 wes say, 1.25, 0.05 wes say, 1.25, 1.05, 0.15 wes say, 1.25, 1.05, 1.05 wes say, 1.25, 1.05, 1.05, 1.05 wes say, 1.25, 1.05, 1.05, 1.05, 1.05 wes say, 1.25, 1.25 wes say, 1.	135, 125, 035	5		2.1	NaCl	0.5 - 10	20.2	0.2	136, 138, 141, 144	328, 360, 440, 700	*	×	3.15, -0.55, -2.85, -5.95	ves	ice lids, gradually increased thickness
Heart   Color   Line	42, 14, 21, 2, 25, 105, 115, 105, 115, 105, 115, 105, 115, 105, 115, 105, 115, 105, 115, 105, 115, 105, 115, 105, 115, 105, 115, 105, 115, 105, 115, 105, 115, 105, 115, 11	423,115,115,110,115,115,110,115,115,115,110,115,115	9	alt fast	1.7	MgSO <sub>4</sub>	0.5 - 10	18.5	0.6	140, 141, 140, 142	327, 330, 340, 345	14	82	3.25, 2.35, 1.25, 0.95	ves	ice lids, gradually increased thickness
State   first   10,	33,16,5,10,715 wes 33,16,5,46,146 wes 37,3,2,4,4	33,145,105,135 (1975)  327,145,44 335,146,346,346,346  37,37,349,41 335,145,348,348  31,14,24,32 13,349,348  31,14,24,32 13,349,348  31,14,24,34 13,349  31,14,34,34 13,349  31,14,34,34 13,34,349  31,34,34,34 13,349  31,34,34,34 13,349  31,34,34,34 13,349  31,34,34,34 13,349  31,34,34,34 13,349  31,34,34,34 13,349  31,34,34,34 13,349  31,34,34,34 13,349  31,34,34,34 13,348  31,34,34,34 13,348  31,34,34,34 13,348  31,34,34,34 13,348  31,34,34,34 13,348  31,34,34,34 13,348  31,34,34,34 13,348  31,34,34,34 13,348  31,34,34,34 13,348  31,34,34,34 13  31,34,34,34 13  31,34,34,38 13  31,34,	7 s.		1.9	Na <sub>2</sub> SO <sub>4</sub>	0.5 - 10	19.2	0.6	142, 142, 143, 147	298, 385, 380, 345	***	19	4.25, 1.45, 2.15, 2.55	sek	mirabilite precipitation in d
Heart   Lange   Lang	3.55, 145, 246, 355, 346, 355, 346, 355, 346, 355, 346, 355, 346, 345, 347, 347, 347, 347, 347, 347, 347, 347	33,142,636,346,435 vess 37,34,41 349,245,346,435 vess 37,34,41 349,243,343,345 vess 51,12,45 143,446,75,25,215,335 vess 3,13,26,32 0.015,215,215,335 vess 42,42,43,43 20,215,215,125,335 vess 42,42,43,43 20,215,215,125,335 vess 39,43,39 20,215,215,215,335 vess 44,42,43,43 20,215,215,215,335 vess 34,43,43,43 20,215,215,215,335 vess 26,37,43 23,43 20,215,215,215,335 vess 26,37,43 23,43 20,215,215,215,335 vess 35,33,34,33,34 135,345 vess 35,33,33,33 135,33,25,35,35,35 vess 35,33,33,33 135,33,25,35,35,35 vess 35,33,33,33 135,35,35,35,35 vess 35,33,33,33 135,33,35,35,35 vess 35,33,33,33 135,33,35,35,35 vess 35,33,33,33 135,33,35,35,35 vess 35,33,33,33 135,33,35,35,35 vess 35,33,33,33 135,33,35,35,35,35 vess 35,33,33,33 135,33,35,35,35 vess 35,33,33,33 135,33,35,35 vess 35,33,33,33 135,33,35,35 vess 35,33,33,33 135,33,35,35 vess 35,33,33,33 135,33,35,35 vess 35,33,33,33,33 135,33,35 vess 35,33,33,33 135,33,35 vess 35,33,33,33,33 135 vess 35,33,33,33 135 vess 35,33,33,33,33 135 vess 35,33,33,33 135 vess 35,33,33,33,33 135 vess 35,33,33,33 135 vess 35,33,33,33,33 135 vess 35,33,33,33 135 vess 35,33,33,	· 60		0.7	Na,SO	0.5 - 10	18.35	0.4	140, 141, 144, 150	325, 326, 395, 420	¥	26	3.37, 1.55, 1.05, 7.15	sak	mirabilite precipitation in d
Mathematic   Mat	17,12,2,6,3.7 0.05,6,5.55,4.65 per 17,2,3.9.4 1. 205,2.5.25,3.5.35 per 17,2,3.9.4 1. 205,2.5.25,2.5.35 per 17,2,4.5 1. 205,2.25,2.5.35 per 17,2,4.5 1. 205,2.25,2.5.35 per 17,2,4.5 1. 205,2.5.25,2.5.35 per 17,2,4.5 1. 205,2.5.25,2.5.35 per 17,2,2.5.35 per 17,2,2.5.35 per 17,2,2.5.35 per 17,2,2.5.35 per 17,2,2.5.35 per 17,2,2.35 per 17,2.35 per 17,2.	17,12,2,6,3.7	9		1.7	Na, SO.	0.5 - 10	18.05	0.3	140, 140, 141, 144	310, 337, 338, 340	ar .	22	3.55, 1.45, 3.45, 4.35	sek	mirabilite precipitation in d
	37,37,34,41 339,523,338 yes  405,335,235,338 yes  205,235,235,335 yes  31,12,445 1136,637,23,535 yes  31,12,445 21,537,515,338 yes  213,243,44 22,537,515,338 yes  42,42,45,43 22,525,245,338 yes  42,42,45,43 22,525,245,338 yes  42,42,45,43 22,525,245,338 yes  43,43,43,4 22,525,245,338 yes  39,4,32 34 205,245,245,348 yes  25,537,49 22,525,245,245 yes  25,537,43 23 21,525,245,245 yes  25,537,43 23 21,525,245,245 yes  25,71,37,38 21,525,245,253,46 yes  37,13,37,38 21,525,245,345 yes  37,13,37,38 21,525,245,345 yes  37,32,37 21 215,425,425 yes  25,23,23,27 215,235,255,255 yes  25,23,23,27 215,23,255,255 yes  25,23,23,27 215,23,255 yes  25,23,23,27 215 yes  25,23,23,23,25 yes  25,23,23,23,23 yes  25,23,23,23 yes  25,23,23,23 yes  25,23,23,23 yes  25,23,23,23 yes  25,23,23,23 yes  25,2	37,37,34,41 339,523,338 yes (65,325,23,338 yes (65,325,23,338 yes (73,325,215,338 yes (73,338 yes	20 01		9.0	llo	10	18.65	1	138, 145, 140, 136	347, 849, 426, 240	26.1, 18.1, 20.9, 20.4	3.7, 1.8, 2.6, 3.7	0.65, -6.55, 5.55, 4.65	sak	c,d frozen whole volume
silt         fat         0.5         0.5         1.6         0.5 <td>405,215,215,315 yes  51,12,43 1.05,22.5,15,315 yes  3,12,63.2 1.05,607,725,005 yes  43,43,43,4 2 205,215,155,105,315 yes  42,43,43,4 2 205,215,155,105,315 yes  42,43,43,4 2 205,215,155,135 yes  43,43,44,4 2 205,215,155,135 yes  44,44,4,4,4,15,155,155,135 yes  25,3,43 1.42,44,1 2.85,215,215,135 yes  25,3,43 1.25,34 2 205,235,25,35 yes  25,3,43 1.25,34 2 205,235,25,35 yes  25,3,43 1.25,34 2 205,235,25,35 yes  43,3,3,43 1.25,35 1.05,35 2.05,35 yes  43,3,3,43 1.05,33,35,155,35 yes  43,3,3,43 1.05,33,25,35 yes  43,3,3,3,3,3 1.05,335,25,35 yes  43,3,3,3,3,3 1.05,335,25,35 yes  43,3,3,3,3,3 1.05,335,25,35 yes  43,3,3,3,3,3 1.05,335,25,35 yes  43,3,3,3,3,3 1.05,335,25 yes  43,3,3,3,3,3 1.05,335,25 yes  43,3,3,3,3,3,3 1.05,335,25 yes  43,3,3,3,3,3 1.05,335,25 yes  43,3,3,3,3,3 1.05,335,25 yes  43,3,3,3,3,3,3 1.05,335,25 yes  43,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3</td> <td>405,235,235,235,335 yes  3,1,2,4,3  3,1,2,4,3  4,3,4,3,4,4  4,4,4,4,4,4,4,4,4,4,4</td> <td>11</td> <td>III fast</td> <td>1.7</td> <td>IIo</td> <td>0.5</td> <td>18.95</td> <td>0.4</td> <td>142, 143, 143, 144</td> <td>333, 351, 347, 318</td> <td>21.4, 21, 21, 19</td> <td>3.7, 3.7, 3.9, 4.1</td> <td>3.95, 2.95, 3.25, 3.85</td> <td>sak</td> <td>similar times, similar lid thickness</td>	405,215,215,315 yes  51,12,43 1.05,22.5,15,315 yes  3,12,63.2 1.05,607,725,005 yes  43,43,43,4 2 205,215,155,105,315 yes  42,43,43,4 2 205,215,155,105,315 yes  42,43,43,4 2 205,215,155,135 yes  43,43,44,4 2 205,215,155,135 yes  44,44,4,4,4,15,155,155,135 yes  25,3,43 1.42,44,1 2.85,215,215,135 yes  25,3,43 1.25,34 2 205,235,25,35 yes  25,3,43 1.25,34 2 205,235,25,35 yes  25,3,43 1.25,34 2 205,235,25,35 yes  43,3,3,43 1.25,35 1.05,35 2.05,35 yes  43,3,3,43 1.05,33,35,155,35 yes  43,3,3,43 1.05,33,25,35 yes  43,3,3,3,3,3 1.05,335,25,35 yes  43,3,3,3,3,3 1.05,335,25,35 yes  43,3,3,3,3,3 1.05,335,25,35 yes  43,3,3,3,3,3 1.05,335,25,35 yes  43,3,3,3,3,3 1.05,335,25 yes  43,3,3,3,3,3 1.05,335,25 yes  43,3,3,3,3,3,3 1.05,335,25 yes  43,3,3,3,3,3 1.05,335,25 yes  43,3,3,3,3,3 1.05,335,25 yes  43,3,3,3,3,3,3 1.05,335,25 yes  43,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3	405,235,235,235,335 yes  3,1,2,4,3  3,1,2,4,3  4,3,4,3,4,4  4,4,4,4,4,4,4,4,4,4,4	11	III fast	1.7	IIo	0.5	18.95	0.4	142, 143, 143, 144	333, 351, 347, 318	21.4, 21, 21, 19	3.7, 3.7, 3.9, 4.1	3.95, 2.95, 3.25, 3.85	sak	similar times, similar lid thickness
sit         fat         0.5         0.5.10         130         0.41,421,433,44         345,393,305,43         345,377,243,88         48,477,243,88         48,477,243,88         48,477,243,88         48,477,243,88         48,477,243,88         48,477,243,88         48,477,243,88         48,477,243,88         48,477,243,88         48,477,243,88         48,477,243,88         48,477,243,88         48,477,243,88         48,477,443,88         48,477,443,88         48,477,443,88         48,477,443,88         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,48         48,477,443,44         48,477,443,44         48,477,443,44         48,477,444,44	255,22,2,5,95  3,1,2,6,2  3,1,2,6,2  43,4,3,4  42,4,4,4  42,4,4,4  43,4,4,4  43,4,4,4  44,4,4,4  44,4,4,4  44,4,4,4  45,3,4,3  45,3,4,3  45,3,3,4,3  46,3,3,4,3  47,3,3,4  48,3,3,4,3,3  48,3,3,4,3  48,3,3,4,3  48,3,3,4,3  48,3,3,4,3  48,3,3,4,3  48,3,3,4,3  48,3,3,4,3,3  48,3,3,4,3  48,3,3,4,3  48,3,3,4,3  48,3,3,4,3  48,3,3,4,3  48,3,3,4,3  48,3,3,4,3  48,3,4,3,3  48,3,4,3,3  48,3,4,3,3  48,3,4,3,3  48,3,4,3,3  48,3,3,4,3  48,3,3,4,3  48,3,3,4,3	255,22,2,5,95  31,1,2,6,2  3,1,2,6,2  31,1,2,6,3  31,1,2,6,3  31,1,2,6,3  31,1,2,6,3  42,4,3,4,4  20,2,5,2,6,3,3  31,3,3,4,3,3  31,3,3,3,3,3  31,3,3,3,3,3  31,3,3,3,3	12 s.		1.7	CaSO <sub>a</sub>	0.5 - 10	19.65	0.2	146, 147, 147, 146	318, 337, 353, 350	8 864 8		4.05, 3.55, 2.35, 5.35	yes	increased thickness for d
off         fort         0.5         off         1.2         0.4         1.44.44.13.13         3.55.70.74.63         3.11.24.3         1.12.43	3,11,2,43 3,13,2,632 3,13,2,632 3,13,2,633 3,13,2,63,23 3,13,13,5,165,385 4,2,4,2,4,4 2,0,5,16,15,175,165,385 3,9,4,3,9 3,9,4,3,9 3,9,4,3,9 3,1,3,3,4,4 2,0,5,1,5,175,175,185 2,6,3,3,4 2,2,3,2,3,2,3,2,3,2,3,3,3,3,3,3,3,3,3,3	3,11,2,43 3,13,6,52,26,505 3,13,2,6,325 3,15,17,5,16,385 43,43,44 2,05,2,46,325 42,42,43,43 2,05,2,13,23,46 3,9,4,39 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,4,4 3,9,4,	13 s.		0.7	CaSO <sub>4</sub>	0.5 - 10	19.05	0.7	141, 142, 143, 143	325, 335, 337, 363	**	.0	2.95, 2.25, 2.15, 3.95	yes	similar freezing time and lid thickness
off         fot         0.5         off         145,131,105,144         383,124,41386         3.43,124,1263         3.43,243,243         4.53,55,655,465         yes           sult         fat         0.2         0.200,         1.25         0.2         144,141,144,176         355,203,103,103         3.43,43,44         2.53,55,55,25,23,133         yes           sult         fat         0.2         0.20         0.2.10         1.25         0.2         144,141,144,176         355,203,133,33         3.43,434         2.53,53,53,133         yes           sult         fat         0.2         1.25         0.3         1.44,144,146         355,203,132         3.44,434         2.53,53,53,53         yes           of         1.2         1.2         1.2         1.2         1.2         1.2         1.25,13,134         355,203,135         3.44,434         2.53,53,53,53         yes           of         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.25,33,133,135         3.4         3.4         3.4         3.4         3.4         3.5         3.5         3.5         3.5         3.5         3.5         3.2         3.2         3.2         3.2         3.2         3	3,13,24,32	3,13,24,32			0.5	III	10	18.75	0.2	141, 146, 143, 138	316, 709, 462, 310	27.5, 17.7, 22.6, 19.8	5.1, 1, 2, 4.5	1.45, -6.65, 7.25, 5.05	sak	c,d frozen whole volume
sit         fit         0.5         0.5-10         1865         0.2         149,147,147,147,147,147,147,147,147,147,147	131,516,518.5 wes 44,43,4 205,245,13.18 wes 42,44,43,4 205,215,173,185 wes 17,12.39,4 39 205,215,173,13.18 per 17,12.39,4 4,39 305,215,215,315 per 18,14,2,4 4,1 205,215,215,215,215 per 18,14,2,4 4,1 205,215,215,215,215 per 18,2,3,4,4,1 20,3,2,215,215,215,215 per 18,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,	131,516,5185 wes 43,43,4 205,218,173,195 per 44,44,43 205,218,173,195 per 17,123,94 20 205,218,173,135 per 17,123,94 20 205,718,173,135 per 18,14,2,44 20 205,718,173,135 per 18,14,2,44 20 205,718,173,135 per 18,34,43,40 205,718,125,125,125 per 18,34,43,40 205,718,125,125,125 per 18,34,43,40 205,718,125,125,125 per 18,34,34,34 20 205,218,218,125 per 18,34,34,34 30 205,34,34,35,35 per 18,34,34,34 30 205,34,34,35,35 per 18,34,34,34,34 30 205,34,34,35 per 18,34,34,34,34 30 205,34,34,35 per 18,34,34,34,34 30 205,34,34,35 per 18,34,34,34,35 per 18,34,34,34,35 per 18,34,34,34,35 per 18,34,34,35 per 18,34,35 per 18,34,34 per 18,34,35 per 18,34,34,35 per 18,34,34,35 per 18,34,34,35 per 18,34,34,34,35 per 18,34,34,34,35 per 18,34,34,34,35 per 18,34,34,34,35 per 18,34,34,34,34,34,34,34,34,34,34,34,34,34,			0.5	all	10	18.35	0.4	145, 151, 146, 144	393, 721, 481, 386	24.8, 17, 18.7, 18.7	3, 1.3, 2.6, 3.2	-0.15, -5.55, 0.75, 4.85	sak	c,d frozen whole volume
sit (b)         fet         0.6         0.5.10         1357         0.3         144,144,144,145         313,123,138,333         43,43,43         25,25,245,125         no           oil (b)         fet         0.6         0.5         125         0.6         144,144,144,145         313,123,133,33         3.2         43,43,43         205,255,245,125         no         no           oil (b)         0.6         125         0.6         144,144,144         313,123,133,33         42,43,43         245,43,43         25,255,255,333,333         no         no         no         no         no         146,144,144         31,123,133,33         32,43,43         245,253,33,333,33         no         no         no         no         146,144,144         31,123,143         31,123,143         32,43,43         245,253,253,25         no         no         no         no         146,144,144         36,333,346,33         32,43,43         245,25,33,33,33         no         no         no         no         146,144,144         31,43,444         31,43,43         245,25,33,33,33         no         no         no         no         no         166,144,144         31,43,34         31,43,43         245,43,43         25,25,25,25,25         no         no         no         no         <	235,245,245 no no 44,43,444 2.45,245,245,245 no 44,42,44,43 2.45,245,245,345 no 44,42,44,41 2.45,245,245,245 no 44,44,41 2.45,245,245,245 no 26,37,42,44,1 2.85,245,245 no 26,37,43,44 1 2.85,345,245 no 26,37,43,44 1 2.85,345,275 no 36,32,347 1 2.85,345,345 no 26,34,32,347 1 2.85,35,35,35,35,35 no 26,34,32,347 1 2.85,35,35,35,35 no 26,34,32,347 1 2.85,345,345,345 no 26,34,32,347 1 2.85,345,345,345 no 26,34,34,34 2 2.85 no 26,34,34,34 2 3.37 1 2.85,345,345,345 no 26,34,34,34 2 3.37 1 2.85,345,34,34 2 3.37 1 2.85,345,34,34 2 3.37 1 2.85,345,34,34 2 3.37 1 2.85,345,34,34 2 3.37 1 2.85,345,34,345 no 26,34,34,34 2 3.37 1 2.85,345,34,34 2 3.37 1 2.85,345,34 1 2.85,345,34 1 2.85,345,34 1 2	235,245,245 no no 44,44,44			0.7	CaSO <sub>2</sub>	0.5 - 10	18.65	0.2	142, 142, 142, 144	395, 330, 350, 397	r		3.15, 1.75, 1.65, 3.85	yes	similar lid thickness
off         fort         0.8         off         17.55         0.8         145,121,127,125         312,211,223         212,201,23,23         434,43,43         205,125,175,155         yes           off         off         10.0	44.43.44 205.17.71.135 per 42.42.43.44 205.17.71.135 per 42.42.43.44 205.71.71.13.15 per 43.47.43.45 205.71.5.15.31.5.315 per 43.47.44.1 205.71.5.15.35.315 per 43.47.44.1 205.71.5.15.35.315 per 43.47.44.1 205.71.5.15.35.315 per 43.47.44.1 205.71.5.15.35.315 per 43.47.44.1 205.71.5.15.35.35 per 43.47.44.1 205.71.5.25.35.35.35 per 43.47.44.1 205.71.5.25.35.35.35.35 per 43.47.44.1 205.71.5.25.35.35.35.35 per 43.47.44.1 205.71.5.25 per 43.47.1 205.71.5.	44.43.44 205.12.72.13.65 per 42.42.43.44 205.12.72.13.65 per 42.72.43.46 205.72.15.15.3.63 per 43.72.43.46 205.72.15.15.3.63 per 43.42.44 205.72.15.15.3.63.25 per 43.42.44 205.72.15.15.3.63.25 per 43.42.44 205.72.15.15.3.65 per 43.42.44 205.72.15.15.3.65 per 43.42.44 205.73.2.5.2.5.25 per 43.42.44 205.73.2.5.2.5 per 43.42.44 205.73.2.2.5 per 43.42.44 205.73.2.2.5 per 43.42.44 205.73.2.2.5 per 43.42.44 205.72.2.5 per 43.42.44 205.72.2.5.2.5 per 43.42.44 205.72.2.5 per 43.42.42.42 205.72.5 per 43.42.42 205.72			9.0	CaSO <sub>a</sub>	0.5 - 10	18.75	0.3	144, 144, 144, 145	335, 323, 318, 393	¥	25	2.75, 2.95, 2.45, 3.25	ou	freezing does not occur gradually
off         for         0.5         0.6         1.87         0.6         1.84,24,19,44         305,233,296         31,231,46,12         24,44,45         24,44,43         24,44,43         24,44,43         24,43,43         24,43,43         24,43,43         24,43,43         24,43,43         24,43,43         24,43,43         24,43,43         24,43,43         24,43,43         24,43,43         24,43,43         24,43,43         24,43,43         24,53,53,53,53         24,23,43         24,23,43,43         24,2	4,2,4,4,4,4 2,5,4,5,13,3,13, per 3,2,12,3,4,4,9 2,9,15,3,15,3,13,3,13 per 3,2,1,12,3,4,4,9 3,00,5,15,15,15,3,3,3,3,3,4,4,1 2,4,4,1 2,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5	4,2,4,4,4,4 2,24,5,13,13,13 per 27,12,3,4,4 2			8.0	all	0.5	17.95	0.3	145, 147, 147, 146	313, 312, 311, 323	21.2, 20.1, 23, 23.5	4.3, 4.3, 4.3, 4	2.05, 2.15, 1.75, 1.95	sak	similar freezing time and lid thickness
off         skw         0.5         all         19.5         0.4         19.5	27,12,23,46 0.05,715,515,515 no 21,12,23,46 105,215,515,515 no 21,12,12,13,66 105,715,515,515 no 21,12,12,13,66 105,715,515,515 no 21,12,12,13,515 no 21,12,13,13,13,13,13,13,13,13,13,13,13,13,13,	27,123,46 005,715,515,515 no 23,44,39 205,205,205,205,205,205,205,205,205,205,			0.5	III	0.5	18.75	9.0	148, 149, 149, 148	305, 308, 293, 296	19.1, 18.7, 18.6, 19.1	4.2, 4.2, 4.5, 4.3	245, 235, 3.15, 3.15	sak	similar boiling and freezing times, thickness
OL worst         fot         11         -         1.56         0.1         440,441,401,400         360,500,500,322         1.75,454,512         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,44.39         343,14.24         343,44.39         343,44.39         343,44.39         343,44.39         343,14.24         343,44.39         343,14.24         343,44.39         343,14.24	34,439 305,285,332	34,439 30,4439 190,528,583,325 yes 31,313,24		575.0	0.5	III	10	19.15	0.3	1765, 1771, 1770, 1763	2471, 3653, 2476, 2354	18.4, 18, 18.1, 18.7	3.7, 12, 3.9, 4.6	0.95, -7.15, 5.15, 5.35	00	strongly different boiling and freezing times
D1 worter   fist   15   155	14.4.3.2.4.6 225,25.9.5.4.6.5 no 41,4.2.4.4.1 2.85,215,215,215,215 (18.7.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.	14.43.24.66 275.25.95.16.56 no 41.42.44.1 2.05.15.215.215.515.515.215.215.215.215.215			11	68	100	17.45	0.15	140, 141, 140, 140	309, 310, 308, 312	17, 16.6, 17, 17	3.9, 4, 4, 3.9	3.05, 2.85, 2.85, 3.25	sek	reference experiment, similar trends of a-d
D1, worder   fast   15	44.42,441 2.58,5.5.5.5.5.5.5 yes 26.37,49 2.58,5.5.5.5.5 yes 3.5.3,49 1.58,5.5.5 yes 3.5.3,42 2.7 2.58,5.5.5.5.5 yes 3.5.7,3.5.2 2.7 2.5.5.5.5.5.5.5 yes 3.5.3,3.3,3.3 1.55,4.5.5.5.5.5.5 yes 1.5.3,4.3,3.3 1.5.3,4.5.5.5 yes 3.7,3.3,3.3 1.5.3,4.5.5.5 yes 3.7,3.3,3.3 1.5.3,4.5.5 yes 3.7,3.3,3.3 1.5.3,4.5 yes 3.7,3.3,3.3	44.4.2, 44.1 2.58, 2.5.15.2.6.5 yes 2.6.3.7.49 2.5.7.5.15.2.6.5 yes 3.5.3.7.49 2.5.7.5.5.2.5.5 no 3.3.3.4.41 2.5.5.2.5.5.5.5.5.5.5 no 3.3.3.4.2.2 2.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5			1.1	W	×	15.85	0.2	1355, 1357, 1351, 1352	1638, 1639, 1632, 1624	13.7, 13.6, 14, 14	3.1, 3.1, 3.2, 3.6	2.75, 2.85, 2.95, 1.65	ou	reference experiment, similar trends of a-d
D1, water   fast   12     1005, 1565, 3485     1505, 1505, 3485     1505, 1505, 3485     1505, 1505, 3485     1505, 1505, 3485     1505, 1505, 3485     1405, 1505,	26,37,49 25,535,535 (ws. 25,3,43 15,375,515 no   33,37,34,39 224,345,245 no   33,735,32,27 225,25,565,255 no   33,735,38 135,245,155,345 no   34,1,35,38 125,135,135,455 no   34,1,35,38 125,135,135,455 no   34,13,3,3 12,33 125,435,135,455 no   34,32,3,3 12,435,435,135,455 no   34,32,3,3 12,435,435,435,755 no	26,37,49 25,535,535 (ws) 25,3,43 1.05,375,515 no 33,37,34,39 245,305,195,255 no 33,7,35,27 225,25,56,255 no 37,35,38,31 1.55,255,165,345 no 34,1,35,31 1.55,315,175,485 no 34,1,35,31 1.55,315,175,485 no 34,31,31,31 1.55,315,315,375,375 no		E.	1.5	o	12	16.05	0.3	141, 139, 142, 142	305, 303, 306, 304	16.3, 17.1, 16, 16	4.1, 4.2, 4, 4.1	2.85, 2.15, 2.15, 2.65	yes	reference experiment, similar trends of a-d
Di. voter slow 09	2.5.3,4.3 1.5.5.5.15 no 2.5.3,4.3 1.5.5.5.15 no 3.3,2.3,2.27 2.5.3,2.5.5.5.5 no 3.3,2.3,2.27 2.5.3,2.5.5.5.5.5 no 3.3,2.3,2.3,3.3 1.5.3,2.5,2.5.5.5.5 no 3.3,1.3,3.3.8 1.5.3,2.3,2.3,5.5.5 no 3.3,1.3,3.3.8 1.5.3,3.3,1.5,3.4.5 no 3.3,1.3,3.3.8 1.5.4,3.5,1.5.7.5 no 3.4,3.3,3.2 1.5.4,3.5,2.5.5 no 3.4,3.3,3.2 1.5.4,3.5,2.5.5 no	2.5.3,4.3 1.5.5.5.15 no 2.5.3,4.3 1.5.5.5.15 no 3.3.2,2.7 2.5.5.5.5.5.5.5 no 3.3.2,2.7 2.5.5.5.5.5.5.5.5.5 no 3.3.2,2.3.2.2 1.5.5.2,5.5.5.3.45 no 3.3.2,3.2.3.2 1.5.5.2,5.5.5.3.45 no 3.3.2,3.2.3.2 1.5.5.3.5.1.5.3.45 no 3.3.2,3.2.3.2 1.5.5.3.5.1.5.2.75 no 3.3.2,3.3.2 1.5.4.3.5.1.5.5.75 no 3.3.3.2,3.2.2 1.5.4.3.5.2.5.75 no		15 76	1.2	e	E	10.85, 16.95, 34.85	10	169, 145, 99	334, 310, 268	12.6, 17.9, 60.5	2.6, 3.7, 4.9	2.35, 2.95, 5.25	sak	tested various T of water
off         slow         2.3         off         18.55         0.4         1861,186,1367,1364,1722,1702,1726         155,516,167.7         33,37,34,49         255,385,259,259         no           all         slow         1.7         all         slow         1.7         1755         0.7         136,136,1367,1354         157,1722,1702,1727         35,27,32,42         25,23,265,255         no           all         slow         0.7         all         1.75         135,136,1367,1364         157,132,172,174         35,27,32,22         25,23,265,155         no           all         slow         0.7         all         1.75         135,136,1363,156         107,127,174         37,36,38,38         1.85,245,165,485         no           all         slow         0.7         all         1.75         1.75,132,172,174         37,134,33         1.85,245,165,485         no           all         slow         0.7         all         1.91         0.4         1191,155,150         105,155,150         125,155,150         125,155,150         125,155,150         125,155,150         125,155,150         125,155,150         125,155,150         125,155,150         125,155,150         125,155,150         125,155,150         125,155,150         125,155,150         125,155,150	33,37,34,39 245,305,315,255 no 33,52,73,27 225,235,265,255 no 1,37,56,58,38 155,1435,175,485 per 34,1,35,38 155,1435,175,485 per 37,11,37,38 105,435,275 no 34,32,3,32 135,055,275, no	33,3,2,4,3,3 35,2,3,3,2 37,36,38,38 37,3,3,5,38 37,1,3,5,38 37,1,3,5,38 37,1,3,3,38 37,1,3,3,38 37,3,3,3,3 135,4055,205,- 105,405,305,- 105,405,305,- 105,405,305,- 105,405,305,- 105,405,305,- 105,405,305,- 105,405,305,- 105,405,305,- 105,405,305,- 105,405,305,- 105,405,305,- 105,405,305,- 105,405,405,- 105,405	25 D.L.		6.0	×	200	2.85, 17.35, 27.25	×	1440, 1292, 1098	1636, 1615, 1572	6.7, 16.3, 37.4	2.5, 3, 4.3	1.95, 3.25, 5.15	no	tested various T of water
all slow 1.7 all 0.5 1755 0.7 1366,1367,1364 1756,174 35,273,2.27 225,5.25,5.65,255 no said slow 0.7 all 1265, 1265,1364,1367,1367 16,124,15,174 35,235,456,255 no said slow 0.8 all 10 1915 0.4 1947,151,5190,195 1907,1852,183,185,185,185,185,185,185,185,185,185,185	8.5/2.3.2.2.7 2.53.2.8.6.2.5.8 no 3.7,3.6.2.8.8 1.85,2.65,1.65,3.48 no 3.4,1.3.5.8 1.85,1.25,1.85,1.75,4.85 ves 1 3.7,1.3.7,3.8 405,4.6.5.3.5,7.5 no 3.4,3.2,3.2 1.85,4.35,7.5 no	8.5,7.34,2.7 2.35,2.56,5.55, no 3.7,34,8,8,38 1.85,245,165,345 no 3.4,1,35,38 1.35,345,155,345 ve 3.4,1,35,38 1.35,345,155,485 ve 3.7,11,37,38 0.05,46,3.35,275 no 3.4,32,3,32 1.35,055,705,		375	2.3	llo	0.5	18.15	0.4	1863, 1852, 1859, 1849	2292, 2297, 2301, 2256	16.5, 17.5, 16.8, 17.7	3.3, 3.7, 3.4, 3.9	2.45, 3.05, 1.95, 2.95	ОИ	similar trends, lid thickness
all slow 0.7 all 0.5 1756 1 1575 1 1575 151591355 1597,1522,124 17,56,3,3,3,3 155,45,56,3,53,5 no 18,2,56,45,3,5,3,4 no 19,15 10,15,1500,1495 1757,225,1590,1790 182,164,175,179 34,13,3,3 155,43,5,175,43,5,179 34,13,3,3 155,43,5,175,43,5,175 17,13,13,3 10,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,	18, 545, 68, 38 38 1185, 545, 56, 345 no 34, 133, 38 1185, 545, 155, 545 no 34, 13, 13, 23, 23, 23, 23, 23, 23, 23, 23, 23, 2	1.5, 5, 5, 5, 5, 3, 3, 5, 15, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5			1.7	lle	0.5	17.95	0.7	1386, 1366, 1387, 1364	1725, 1722, 1710, 1715	16, 12.4, 16, 17.4	3.5, 2.7, 3.2, 2.7	2.25, 2.35, 2.65, 2.55	no	similar trends, lid thickness
all slow 0.8 all 10 1915 0.4 1349,1356,1369 1755,129 184,155,179 344,153,38 1.55,435,175,455 was all slow 0.5	3.4,1.3.3.38 1.155,4.354,1.75,455 yes 1.3,7,1.1.3.7.3.8 0.05,-6.6,3.25,2.75 no 3.4,2.2,3.22 1.35, 0.55,-2.05,- no	34,13,3,8 115,435,175,485 wes 37,11,3,7,3,8 0.05,-68,3,2,7,5 no 34,12,3,3,2 135,055,-7 no			0.7	lle	0.5	17.85	1	1578, 1563, 1559, 1556	1807, 1832, 1818, 1804	16.1, 16.9, 17.2, 17.4	3.7, 3.6, 3.8, 3.8	1.85, 2.45, 1.65, 3.45	ou	similar trends, lid thickness
all slow 0.5 all 10 1865 0.4 1374,1366,1378,1369,1590,175,159,159,184,137,13,37,38 -0.05,-6.65,3.25,275 no : minture fast 1.1 Wejso,-Wejso,Pasz,-252,252,253, 18,15,159,189,141,139,141,149,149,147,147,175,175,168 34,32,3,32 135,-055,-205,- no	1 37,11,37,38 405,46,335,275 no 34,32,3,32 135,435,205, no	3.4.11.3.7,38 405,46,3.75,75 no 3.4.31.3.3 135,035,705, no	29	wols lb	0.8	lle	10	19.15	0.4	1491, 1515, 1500, 1495	1751, 2255, 1802, 1730	18.2, 16.4, 17.5, 17.9	3.4, 1, 3.5, 3.8	1.55, -13.35, 1.75, 4.85	ves	strongly different boiling and freezing tim
minture fast 1.1 WgGQ,Wg,SGGMod 2225/35/252525 18.15 6.3 137,139,119,119,147 77 195,175,158 34,12,3,32 1.35, 055, 2.05, no	3.4,32,3,3.2 1.35,455,-2.05,- no	s 34,32,332 135,055,205, no	30 4	wols lb	0.5	lle	10	18.65	0.4	1374, 1386, 1378, 1368	1686, 1976, 1659, 1590	17.5, 15.9, 16.9, 18.4	3.7, 1.1, 3.7, 3.8	-0.05, -6.45, 3.25, 2.75	no	strongly different trends and precipitatio
	two majors est of experiments. 1) safe with 4 different vivy concentrations (0.3%, 2.5%, 5.8%, 3.5%, 5.8%, 3.5%, 5.8%, 3.5%, 5.8%, 3.5%, 5.8%, 3.5%, 5.8%, 5	Two major sets of experiments: 1] salt with 4 of ferent view concentrations (10.5%, 2.5%, 5% and 109); 2) frout tested salts (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>s</sub> ) with the same concentration with a different view concentrations (10.5%, 2.5%, 5% and 10.9%); 2) frout tested salts (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>s</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt of the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>s</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt of the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>s</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt of the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>s</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>s</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>s</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>s</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>s</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>s</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>o</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>o</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>o</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>o</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>o</sub> ) or current conentrations (10.5%, 2.5%, 5%, 10.5%) and the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>o</sub> ) or current conentrations (10.5%, 2.5%, 5%, 5%, 10.5%) and the salt (MySO <sub>o</sub> , NaCl, Na.SO <sub>o</sub> , CaSO <sub>o</sub> ) or current conentrations (10.5%, 10.	100		1.1	MgSO <sub>4</sub> + Na <sub>2</sub> SO <sub>4</sub> /NaCl		18.15	0.3	137, 139, 139, 141	430, 478, 537, 477	19.5, 17.5, 17.5, 16.8	3.4, 3.2, 3, 3.2	1.35, -0.55, -2.05, -	no	various freezing and thickness
** Approximate time when solution starts for being after from an ice (all) mid-tons a driven to the salt (MagO <sub>a</sub> , NaCl, Na, SO <sub>a</sub> , CASO <sub>a</sub> ) or current conentrations (D.S. K., 2.S. K., 5. K., 1.D. K.)		Themselvine at the field moment before process; and	5 For selected and	deeply analyzed expe	riments; Pressure value	corresponds to positic	on in the middle of the cha	mber (secondary P logger	counts value +1.5 mbar)							
**** Approximate time when solution starts to befine (fractive of time is a point of the cast (MgO <sub>2</sub> ), NaCl, Na, SO <sub>3</sub> , GASO <sub>3</sub> or current conentrations (D.S.K., 2.S.K., 5.K., 10.K). **Approximate time when starts to befine (fractive of the cast	5 For elected and elepty analyzed experiments, Pressure will be corresponds to position in the middle of the chamber lescondary Progger counts value +1.5 milant)		S Temnerature at t.	he final moment hefo	are pressurization											

Tab. S3: Results of thermodynamic simulations of freezing of salt solutions. In all cases, only a single secondary salt phase was predicted to form during freezing. Temperatures are reported to the nearest 0.1 °C. Eutectic temperatures correspond to salt formation temperatures for all solutions with the exception of CaSO<sub>4</sub> solutions, wherein gypsum was supersaturated at room temperature. In this latter case, the eutectic temperature corresponds to the ice formation temperature.

Initial salt	Concentration, wt%	Ice formation temp., °C	Secondary salt phase <sup>a</sup>	Salt formation temp., °C	Eutectic temp., °C
NaCl	0.5	-0.4	Hydrohalite	-21.2	-21.2
	10	-6.0	Hydrohalite	-21.2	-21.2
$MgSO_4$	0.5	-0.2	Meridianiite	-3.8	-3.8
	10	-1.7	Meridianiite	-3.8	-3.8
Na <sub>2</sub> SO <sub>4</sub>	0.5	-0.2	Mirabilite	-1.2	-1.2
	10	-1.2	Mirabilite	-1.2	-1.2
CaSO <sub>4</sub>	0.5	-0.1	Gypsum	20.0	-0.1
	10	-0.1	Gypsum	20.0	-0.1

<sup>a</sup>Hydrohalite: NaCl·2H<sub>2</sub>O; Meridianiite: MgSO<sub>4</sub>·11H<sub>2</sub>O; Mirabilite: Na<sub>2</sub>SO<sub>4</sub>·10H<sub>2</sub>O; Gypsum: CaSO<sub>4</sub>·2H<sub>2</sub>O

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