**SUPPLEMENTARY MATERIAL**

A1 Major mineral phases predicted by PHREEQC in the present investigation and notes on their significance to coastal lagoon environment

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| **Mineral Phases (from PHREEQC)** | **Composition** | **Description** | **Major influencing factors in a lagoon environment** | **References and examples** |
| Aragonite | CaCO3 | Polymorph of Calcium carbonate | Flooding, evaporation, Total dissolved solids, pH, alkalinity | Butler (1969); Mucci (1983) |
| Calcite | CaCO3 | Polymorph of Calcium carbonate | Flooding, evaporation, Total dissolved solids, pH, alkalinity | Butler (1969); Mucci (1983) |
| Chalcedony | SiO2 | Silicon, oxygen; cryptocrystalline form of quartz | low pH and high silica | Umeda (2003) |
| Chrysotile | Mg3Si2O6(OH)4 | Magnesium silicate serpentine material with alternating stacking of Mg(OH)2 and silica | pH and natural organic matter | Bales and Morgan (1985) |
| Dolomite | CaMg(CO3)2 | Anhydrous Calcium magnesium carbonate | Organic Matter (OM), microbial activity, algal mats, Total dissolved solids, sulphates, pH, alkalinity, dissolution and re-precipitation cycles with calcite and aragonite | Butler (1969); Kendall (1978); Vascaoncelos et al. (1995) |
| Gypsum | CaSO4·2H2O | Stable Calcium sulfate | Flooding, evaporation, Chlorinity, Total dissolved solids, pH, alkalinity | Butler (1969); Kendall (1978) |
| Halite | NaCl | Isometric crystals of rock salt | Flooding, evaporation, Chlorinity, Total dissolved solids, pH, alkalinity | Butler (1969); Kendall (1978) |
| Hydroxyapatite | Ca10(PO4)6(OH)2 | Hydroxyl endmember of the apatite group | pH, dissolved phosphate ions, OM, co-precipitation effect with calcite | Lopez and Morgui (1992); Avile et al. (2006) |
| Quartz | SiO2 | Mineral with SiO4 silicon–oxygen tetrahedra | Flooding, evaporation, pH, alkalinity | Wagner and Togt (1973); Vascaoncelos et al. (1995) |
| Sepiolite | Mg4Si6O15(OH)2·6H2O | Complex magnesium silicate clay from marine environments | Flooding, evaporation, pH, alkalinity, closely related to the cycling of Mg-calcite in seawater | Kadir and Akbulut (1991); Yan et al. (2005) |
| Sepiolite (d) |
| SiO2 | SiO2 | Oxide of silicon, usually found in the form of quartz | Flooding, evaporation, pH, alkalinity | Wagner and Togt (1973); Vascaoncelos et al. (1995) |
| Sylvite | KCl | Potassium chloride crystals | Secondary evaporite similar to halite, formed during evaporition in lagoons | Garcia-Veigas et al. (2009) |
| Talc | Mg3Si4O10(OH)2 | Hydrated magnesium silicate clay mineral | Formed during dolomite-magnesite precipitation | Rouse and Sherif (1980); Nishihara (1956) |

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