

Southern Ocean intermediate waters in tropical Pacific thermocline

L.D. PENA¹, K.M. JONES¹, S.L. GOLDSTEIN¹,
S.R. HEMMING¹ AND I. CACHO².

¹Lamont-Doherty Earth Observatory of Columbia University,
61 Route 9W, Palisades, NY 10964, USA
(leopoldo@ldeo.columbia.edu)

²GRC Geociencias Marines, Department of Stratigraphy
Paleontology and Marine Geosciences, Martí i Franquès
s/n, E08028, Barcelona, Spain

There is increasing evidence pointing to the importance of tropical regions, and in particular the tropical Pacific, as active players in glacial-interglacial climate variability during the Pleistocene [1]. The strong obliquity component present in many tropical Pacific records has been suggested to arise from the advection of Southern Ocean waters towards the tropical thermocline during deglaciations (e.g. [2]). These water masses eventually upwell and become incorporated into the Equatorial Under-Current (EUC). We present new Nd isotope results in foraminifera shells (*N. dutertrei*) at ODP Site 1240 (0° 01.31'N, 86° 27.76'W, 2921 mbsl) in the Eastern Equatorial Pacific. The preferential dwelling habitat of *N. dutertrei* is the lower thermocline, at the core of the EUC. Therefore, changes in *N. dutertrei* Nd isotopic compositions will be closely linked to the EUC, ultimately reflecting changes in input from the Southern Ocean.

We utilize rigorous cleaning protocols to ensure the collection of reliable foraminiferal Nd isotope measurements that reflect seawater rather than diagenetic imprints formed in the sediments [3]. Preliminary results show that for REE patterns of cleaned foraminifera display features typical of seawater, including strongly negative Ce anomalies and HREE/LREE enrichment. These results suggest that the REE of cleaned foraminifera are not affected by contaminant phases. In addition, the rinses from the cleaning method should allow us to isolate the Nd from any diagenetic minerals, thus the Nd isotope ratios of these leachates potentially provide valuable information about the deep water circulation changes in the past.

[1] Pena, L.D., Cacho, I., Ferretti, P. and Hall, M.A. (2008), *Paleoceanography*, **23**, PA3101. [2] Liu, Z. and T.D. (2004), *Nature*, **427**, 720-723. [3] Vance, D. and Burton, K. (1999), *Earth and Planetary Science Letters*, **173**, 365-379.

Metastable equilibria in the quaternary system KCl + K₂SO₄ + K₂B₄O₇ + H₂O at 273 K

Y. PENG*, Y. ZENG AND S. FENG

College of Materials and Chemistry & Chemical Engineering,
Chengdu University of Technology, Chengdu, Sichuan, P.
R. China (*correspondence: pengyuncd@gmail.com)

Zabuye Salt Lake, Tibet, is famous for the high concentrations of lithium, boron, and potassium in the world. In order to exploit the salt lake brine resources, the metastable phase equilibrium studies of Zabuye Salt Lake brines are necessary. In this paper, the metastable equilibria of the subsystem KCl + K₂SO₄ + K₂B₄O₇ + H₂O of the Zabuye Salt Lake brines were studied at 273 K.

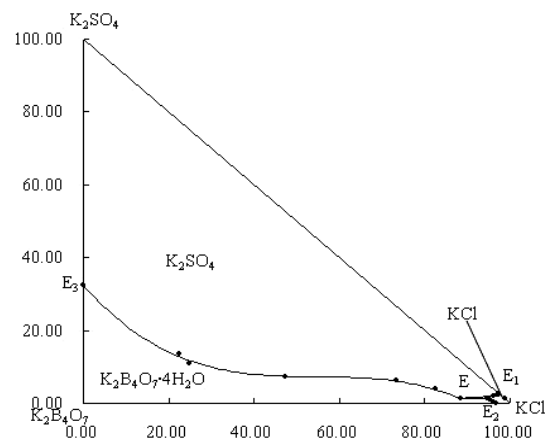


Figure 1: The metastable phase diagram of the quaternary system KCl + K₂SO₄ + K₂B₄O₇ + H₂O at 273 K.

The metastable phase diagram is shown in Figure 1. There are three crystallization fields, three univariant curves, and one invariant point. No double salt is found in this system at research temperature. The crystallizing field of the salt KCl is the smallest, while that of salt K₂SO₄ is the largest. The results indicate that salt K₂SO₄ is of a low solubility; therefore, most salt K₂SO₄ can be crystallized from solution. Salt KCl has an obvious salting out effect on the salt K₂SO₄.

Financial support for this work was provided by the National Nature Science Foundation of China (No. 40673050), the Research Fund for the Doctoral Program of Higher Education from the Ministry of Education (20070616008) of China, and the Youth Fund from Chengdu University of Technology (No.2008QJ04).