## Leopold-von-Buch-Plakette verliehen an Prof. Dr. Miriam Kastner

Dr. Miriam Kastner has been a leader among the geochemical community spanning more than four decades; her insight has permanently shaped our knowledge of marine Earth sciences. She touched numerous big and at first sight small topics while embracing the opportunities provided by ocean drilling, conducting extensive first-hand field work and laboratory experiments. This is more than anybody else's work from among the marine geology community that I am aware of. Equally, her concise publications, high-quality data, well-argued ideas, and spirited discussions are exemplary and recognised world-wide.

Miriam Kastner's dedicated support of women in science is rooted in her own experience working in a male-dominated field. On her formal retirement from the Geological Research Division at Scripps in November 2014 she is shown among her accomplished female student scientists, administrators as well as her numerous male colleagues. Everyone who ever worked with Miriam has been infected by her work ethic, boundless energy, enthusiasm and tireless quest for new knowledge. Her accomplishments remain an inspiration.

Her published work shows a consistent approach in addressing big Earth science issues via geochemical proxies; e.g. trace elements, stable isotopes, mineral phase reactions. Specifically, she addressed element residence times in the ocean, history of seawater, material cycling through subduction zones, ocean productivity, and climate evolution.

Early research focused on make-up of and differentiation between authigenic, diagenetic and detrital components of oceanic sediments. This included neoformation of feldspars, zeolites and clays. She addressed the silica cycle, opal-A–CT-quartz transition, phosphorites, authigenic carbonates and their conditions of formation. The latter included laboratory work on dolomite formation as controlled by pore fluid chemistry. These findings are still relevant with more detailed knowledge today of the origin of the pore fluid make-up such as submarine weathering of detrital alumino-silicates.

Marine barites, that record seawater chemistry via Sr-isotopes or palaeoproductivity by their abundance in oceanic sediments as well as the long-term S-isotope evolution (past 120 Ma) are shown in exemplary studies that originated from Miriam Kastner's laboratory and collaborators. The same may be said for their pioneering work on Cl-isotopes based on pore fluids from global subduction zone sediments. When coupled with δD and $\delta^{18}O$ of the respective pore fluids it became clear that clay-dehydration at low temperature and neoformation of clays at higher temperature controlled interstitial chloride and its isotopic signature. In the very low temperature regime of organic-rich sediments methane hydrate dissociation was recognised as another constraint on the Cl-distribution. Equally, the use of $\delta^{7}Li$ and $\delta^{11}B$ as tracers for fluid sources and fluid-rock interactions over a range of temperatures were pioneered by Miriam Kastner. She saw

to it that advancements based on ocean drilling data were publicised in technical journals and not remained buried in reports.

Throughout the body of Miriam Kastner's work it becomes evident that over time the most important issue she pursued has been fluid flow at subducting plate boundaries with the eventual aim to quantify solute fluxes in and out of fore-arcs. This task was ideally suited to be addressed throughout the phases of ocean drilling. Miriam Kastner was an early advocate of in situ measurements through which she became involved in designing the first continuous long term high-resolution fluid sampler placed inside a borehole (CORK). In reading her own assessment on technical details, methods and application of such an instrument clearly shows how much her heart was into that task.

The final word at fluxes at subduction plate boundaries still eludes scientists who were hoping for a stroke-of-luck as with the heat/3He-ratio for deriving global fluxes from spreading plate boundaries in the 1980s. However, the paper by Kastner et al. (2014)* provides such estimates as encompassing and reliable as we may expect and stands as a landmark. All her experience and all available data are painstakingly synthesised towards that one goal: quantifying the amount of water and solutes per year that enter global subduction zones and return through different pathways with eventual fluid loss to the mantle.

Miriam Kastner's scientific accomplishments deserve the highest praise but should not outshine her service over decades to professional societies, national and international bodies, committees and panels. A selection includes 10 years as editor of Earth and Planetary Sciences Letters and member of editorial boards of other journals as well as panel chairs, planning, steering and executive committee work for ocean drilling. She served as advisor to the NSF Division of Earth Sciences on review and evaluation committees and the National Research Council. Her advice was sought by selection committees for awards, medals and scholarships; she was active in the American Geophysical Union's Ocean Science Fellow Committee.

Miriam Kastner's own list of honours includes selection as Fellow by the American Association for the Advancement of Science, the American Geophysical Union, and the Geochemical Society. Most recently she received the Lifetime Achievement Award by the International Conference on Gas Hydrates. Other prestigious awards include the Francis-Shepard-Medal (2011), Maurice-Ewing-Medal (2008), and the Hans-Petterson-Medal (1999) to which we add the Leopold-von-Buch-Plakette. Congratulations!

* Kastner, M., Solomon, E.A., Harris, R.N. & Torres, M.E. (2014): Fluid origins, thermal regimes, and fluid and solute fluxes in the forearc of subduction zones. – In: Stein, R., Blackman, D.K., Inagaki, F. & Larsen, H. (ed.): Developments in Marine Geology, 7: 671–733.

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