A.W. Hofmann: Geochemistry at all scales

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Geochemistry embraces a large range of scales: from the atomic to the global. A. W. "Al" Hofmann has work at them all. His early work focused on experimental and theoretical studies of diffusion and partitioning in magmatic and hydrothermal systems, particularly with respect to geochronology, including one of the very earliest geochemical uses of ion microprobes [1]. Together with Stan Hart, he applied his understanding of small-scale phenomena to large scale ones in a landmark paper [2], concluding that "the consistent isotopic difference between ocean island and ocean floor volcanics cannot be explained by small-scale heterogeneity." This marked a change of scale to the global. The next major paper "Mantle Plumes from Ancient Oceanic Crust" [3] has become the leading paradigm for understanding the trace element signature of OIB, and indeed mantle evolution. Subsequent studies by others produced a host of stable isotope data demonstrated that material from the deep Earth can be cycled deep into the mantle and returned to the surface, including $\Delta^{33}S$ and most recently, $\delta^{26}Mg$ [4]. His discovery that some incompatible element ratios were invariant between OIB and MORB [e.g., 5] was an important clue to crust-mantle evolution, even while remaining a conudrum. Theoretical papers on the nature of the deep mantle foreshadowed modern thinking on LLSVPs [6,7]. Other topics where he has made major contributions Hawaiian volcanism and plume dynamics [8], Os isotopes, and crustal growth.

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