Geophysical Research Abstracts
Vol. 16, EGU2014-17031-1, 2014
EGU General Assembly 2014

Face of the Earth Keynote Lecture: Life of the Earth

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This is a living planet – the only one we know of. Life is as old as the Earth itself, and from the beginning has been the author and conductor of the biogeochemical cycles of the major elements – carbon, oxygen, hydrogen, sulphur, nitrogen and phosphorus. Life and the surface environment form two parts of a system locked in an evolutionary embrace, such that major biological revolutions, for instance the invention of oxygenic photosynthesis and the colonization of the land surface by multicellular organisms, have driven planet-wide environmental crises that lasted millions of years. At length, from each of these past revolutions, new stable states have emerged, in which the life of the Earth has become more complex and more energetic. The planet we see today is the result of this 4 billion-year-history, and all the life on it owes a deep debt to the distant past. Humanity too, now driving a new biogeochemical revolution, owes such a debt, and we can learn from the study of the deep past how to avoid the worst excesses of the new environmental crisis we face.