Geophysical Research Abstracts
Vol. 15, EGU2013-1269, 2013
EGU General Assembly 2013

The escaping "pneuma" – gas of ancient earthquake concepts in relation to animal, atmospheric and thermal precursors

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For two thousand years ancient European and medieval (including islamic) natural philosophers have considered a dry, warm gas, the "pneuma" (breath, exhalation), escaping from the earth, as precursor and trigger of earthquakes. Also in China an escaping gas or breath (the qi) was considered the cause of earthquake, first in a document from 780 BC. We know today that escaping gas is not causing earthquakes. But it may be that natural phenomena that supported such a pneuma-concept have again and again been observed. The unpolluted environment and the largely absence of distracting artificial stimuli may have allowed the recognition of distinct earthquake precursors, such as described by ancient observers: (1) the sun becomes veiled and has a dim appearance, turns reddish or dark (2) a narrow long stretched cloud becomes visible, like a line drawn by a ruler, (3) earthquakes preceded by a thin streak of cloud stretching over a wide space. (4) earthquakes in the morning sometimes preceded by a still and a strong frost, (5) a surf – line of the air sea is forming (near the horizon).
The described phenomena may be interpreted as a kind of smog forming above the ground prior to an earthquake, a smog exhaled from the ground, which is triggering water condensation, releasing latent heat, changing visibility, temperature, heat conduction and radiation properties. This could perfectly match the phenomenon, which is at the origin of satellite monitored temperature anomalies preceding earthquakes. Based on a few examples it will be shown that the time window of temperature anomalies matches that of reported unusual animal behaviour. It may indeed be caused by the same geophysical phenomenon, a pressure-change induced liberation of "pneuma" –gas. The latter may simply be understood as the consequence of pressure dependent changes of the chemical equilibrium constants within the condensed phases of the underground. They will be proportional to the reaction molar volume of interfacial and bulk geochemical mechanisms and may lead to the desorption and emission of chemical species, which finally reach the earth surface. The nature of reported animal behaviour is supporting such conclusion. Straightforward experimental strategies will be required for characterization of the escaping gas in terms of chemical and nano- and micro- particle composition. Non-linear irreversible thermodynamic models may be invoked for understanding energy turnover during the geophysical precursor activity.