# Earth's atmosphere came from outer space, find scientists

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(PhysOrg.com) -- The gases which formed the Earth's atmosphere - and probably its oceans - did not come from inside the Earth but from outer space, according to a study by University of Manchester and University of Houston scientists.

The report published this week in the prestigious international journal '*Science*' means that textbook images of ancient Earth with huge volcanoes spewing gas into the atmosphere will have to be rethought.

According to the team, the age-old view that volcanoes were the source of the Earth's earliest atmosphere must be put to rest.

Using world-leading analytical techniques, the team of Dr Greg Holland, Dr Martin Cassidy and Professor Chris Ballentine tested volcanic gases to uncover the new evidence.

"We found a clear meteorite signature in volcanic gases," said Dr Greg Holland the project's lead scientist.

"From that we now know that the volcanic gases could not have contributed in any significant way to the Earth's atmosphere.

"Therefore the atmosphere and oceans must have come from somewhere else, possibly from a late bombardment of gas and water rich materials similar to comets.

"Until now, no one has had instruments capable of looking for these subtle signatures in samples from inside the Earth - but now we can do exactly that."

The techniques enabled the team to measure tiny quantities of the unreactive volcanic trace gases Krypton and Xenon, which revealed an isotopic 'fingerprint' matching that of meteorites which is different from that of 'solar' gases.

The study is also the first to establish the precise composition of the Krypton present in the Earth's mantle.

Project director Prof Chris Ballentine of The University of Manchester, said: "Many people have seen artist's impressions of the primordial Earth with huge volcanoes in the background spewing gas to form the atmosphere.

"We will now have to redraw this picture."

The research was funded by Natural Environment Research Council (NERC).

More information: 'Meteorite Kr in Earth's Mantle Suggests a Late Accretionary Source for the Atmosphere' by Dr Greg Holland and Prof Chris J. Ballentine, journal *Science*.

Provided by University of Manchester (news : web)