HEALTH HAZARD FROM ENDOGENOUS GAS EMISSIONS AT CAVA DEI SELCI (ROME, ITALY)

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Background and Aims: Hazardous emissions of endogenous gas (mostly CO_2 and H_2S) occur in many volcanic or geothermal areas. Cava dei Selci (Roma) is a densely inhabited zone on the flank of Colli Albani quiescent volcano where many lethal accidents to animals and also to one person occurred in recent years. In 2010, three houses had to be evacuated because the indoor gas concentration (CO_2 and H_2S) reached hazardous values. A systematic investigation of gas air concentration in houses, near the main gas emission site, has been carried out in 2010-2011 with the aim of assessing the gas hazard.
Methods: In more than 300 houses the CO_2 and H_2S air concentration was measured, by Draeger devises (Xam-7000, IR for CO_2 and electrochemical cell for H_2S). In each house gas analyses were made in bedroom, diningroom bathroom and cellars for a total of 1300 investigated rooms. For a few days, continuous gas monitoring was carried out in houses exposed to high risk. Outdoor gas release from the soil was also estimated by flux measurements (accumulation chamber method).
Results: The investigation has given very worrying results. In the three evacuated houses lethal levels of both gas were found (CO_2 28vol% and H_2S ≥500ppm). An additional 30% of inhabited houses show a potentially hazardous gas concentration that might become very dangerous should the endogenous gas release increase (as in case of local earthquakes). Preliminary indoor Rn concentration measurements (max 23,500 Bq/m^3) indicate that it often exceeds the recommended thresholds and the inhabitants are potentially exposed to a severe risk of lung cancer.
Conclusions: Dangerous indoor air concentrations of H_2S (>250 ppm) and CO_2 (>8 vol%) occur in many houses at Cava dei Selci due to endogenous gas emissions creating a delicate health and socio-economic problem.