MESOTHELIOMA EPIDEMIC IN CAPPADOCIA/TURKEY: GEOLOGICAL MAPPING AS BASIS OF RISK ASSESSMENTS

LOTHAR VIERECK-GOETTE[1]*, PETRA LEPETIT[1], MICHAEL KOCH[1], MANUELA GRUBER[1], ALI GÜREL[2], IBRAHIM ÇOPUROGLU[2], HALIL GURSÖY[3], ORHAN TATAR[3]

[1]*Intitute of Geosciences, Friedrich-Schiller-University Jena, Jena, D-07749, Germany;* [2]*Nigde Üniversitesi, Nide, TR-51100, Turkey;* [3]*Cumhuriyet University, Sivas, TR-58140, Turkey*
Lothar.Viereck-Goette@uni-jena.de

A mesothelioma epidemic known since 1978 causes > 50 % of all deaths in three villages in Cappadocia [1, 2]. The high mortality was shown to be linked to the chronic dust exposure to Erionite, (K2,Ca,Na2)2[Al4Si14O36]·15(H2O), which is known to be a human carcinogen and was detected in the dust of the villages [3]. Erionite is commonly found worldwide in altered silicic tuffs in saline lacustrine sediments [4]. However, except for Cappadocia, nowhere else Erionite exposure could be linked to such a high mortality. Recent studies in Cappadocia [5] revealed, that mesothelioma caused by Erionite may be genetically predisposed. The landscape of central Cappadocia is characterized by ignimbrites and fall-out tuffs of Miocene age (11-5.5 Ma) [6, 7]. The ignimbrites are dominantly non-welded and cover an area of 10.000 km2. Most of the traditional houses were dug as dwellings into the soft, non-welded ignimbrites. Recent houses are built with carved blocks of the ignimbrites, most often unplastered. Inhabitants are thus continuously exposed to dust of tuffs since infancy. Our field studies indicate, that three depositional environments can be distinguished on/in which the ignimbrites came to rest: (a) lacustrine basin (Paleo-Ürgüp-Basin), (b) laharic depositional fans within the Nevsehir Plateau and (c) erosional surfaces [6]. Results show, that the lateral distribution of Erionite is restricted; it only occurs in patches within those tuffs that were deposited in lacustrine environments. Within the ERASMUS program we thus started mapping the depositional facies of sediments directly underlying the base of each ignimbrite in cooperation with the universities of Nide and Sivas. The results indicate, that only the two ignimbrites younger than 7 Ma in age overlay terrestrial sediments. Ignimbrites between 10 and 7 Ma in age overlay lacustrine sediments only in the north. The emplacement facies of ignimbrites older than 10 Ma have not been studied yet. The facies maps indicate variable southward extension of the Paleo-Ürgüp-Basin onto the laharic paleo-plaines exposed in the recent Nevsehir Plateau.

[1] Baris Y et al, Thorax 33, 181–192 (1978)
[2] Artvinli M & Baris Y, J Natl Cancer Inst 63, 17–22 (1979)
[3] Emri S et al, Toxicol Lett 127, 251-7 (2002)
[4] Pooley F, Rev Min, 41-44 (1979)
[5] Carbone M et al, Nat Rev 7, 147-154 (2007)
[6] Viereck-Goette L et al, GSA Spec Publ 464, 85-112 (2010)
[7] Lepetit P, FSU Jena, PhD Thesis, 123 p. (2010)

Keywords: mesothelioma, erionite, geological mapping