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Status of the European Atlas of Natural Radiation

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Abstract : In 2006, the Joint Research Centre (JRC) of the European Commission started the project of the 'European Atlas of Natural Radiation'. The Atlas aims at preparing a collection of maps of Europe displaying the levels of natural radioactivity caused by different sources (indoor and outdoor radon, cosmic radiation, terrestrial radionuclides, terrestrial gamma radiation, etc). The overall goal of the project is to estimate, in geographical resolution, the annual dose that the public may receive from natural radioactivity, combining all the information from the different radiation components. The first map which has been developed is the European map of indoor radon (Rn) since in most cases Rn is the most important contribution to exposure. New versions of the map are realised when new countries join the project or when already participating countries send new data. We show the latest status of this map which currently includes 25 European countries. Second, the JRC has undertaken to map a variable which measures 'what earth delivers' in terms of Rn. The corresponding quantity is called geogenic radon potential (RP). Due to the heterogeneity of data sources across the Europe there is need to develop a harmonized quantity which at the one hand adequately measures or classifies the RP, and on the other hand is suited to accommodate the variety of input data used to estimate this target quantity. Candidates for input quantities which may serve as predictors of the RP, and for which data are available across Europe, to different extent, are Uranium (U) concentration in rocks and soils, soil gas radon and soil permeability, terrestrial gamma dose rate, geological information and indoor data from ground floor. The European Geogenic Radon Map gives the possibility to characterize areas, on European geographical scale, for radon hazard where indoor radon measurements are not available. Parallel to ongoing work on the European Indoor Radon, Geogenic Radon and Cosmic Radiation Maps, we made progress in the development of maps of terrestrial gamma radiation and U, Th and K concentrations in soil and bedrock. We show the first, preliminary map of the terrestrial gamma dose rate, estimated using the data of ambient dose equivalent rate available from the EURDEP system (about 5000 fixed monitoring stations across Europe). Also, the first maps of U, Th, and K concentrations in soil and bedrock are shown in the present work.

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