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Modelling the trend and variability of global krypton-85 concentrations in the troposphere

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^{85}Kr is a radioactive noble gas isotope with a half-life of 10.71 years. Its only source is nuclear fission and it is released during reprocessing of nuclear fuel rods. For an assessment of the detectability of unreported plutonium production facilities through measurements of the related ^{85}Kr emissions, the global ^{85}Kr background due to known nuclear reprocessing plants has to be precisely known. We calculate the background using the general circulation and tracer transport model ECHAM5. The modelled concentrations are evaluated by comparison with observational data and previous studies. Long term trend and temporal variability of ^{85}Kr concentrations are investigated. At selected measurement sites the sensitivity of ^{85}Kr concentrations to the strength of various sources is analysed. Furthermore the characterics of the interhemispheric transport are presented and compared with results from previous studies.