MODELLING ^{210}Pb FOR DATING OF FOREST SOIL PROFILES

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Abstract:
Objective of this modelling is to predict the distribution behavior of radiocaesium in forest soil profile with high accumulation of organic matter and low decomposition ie. in area of temperate or boreal forest. Model concept assumes annual rates of litterfall, 210Pb deposition and organic matter decomposition are constant. Decomposition of litter gradually reduces the mass and volume of annually added litter/organic matter of forest soil layer. Data of unsupported 210Pb is used to date each soil layer which already proved that it is strongly adsorbed with particle of organic matter therefore, naturally occurring 210Pb has been widely used for dating of lake sediment or peat bog. Result of model calculation of data analysed from soil profiles collected at Sherwood Forest in UK found that calculated soil layer of 137Cs originated from nuclear-test-fallout in 1962 dominates at 8 cm which is same as observed data analysed in laboratory. Model was additionally tested for data of soil profile, with low organic matter, collected at pine forest of Wat Chan (Chiang Mai) and teak forest of Khao Krayang (Phitsanulok) which 1 cm error were found. It was concluded that this modelling is likely to work accurately with data of high accumulated organic matter of soil and acceptable inaccurately found with data of soil profile with low accumulated organic matter.