

The CREp Chlorine-36 exposure age and depth profile calculator

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In situ cosmogenic chlorine-36 (^{36}Cl) is so far the only nuclide applicable in carbonate environments and in aphyric Ca- and K-rich silicate rocks. Because the production reactions of ^{36}Cl are more numerous and complex than those of other cosmogenic nuclides (e.g. ^{10}Be , ^3He), comprehensive and user-friendly calculators are essential (Schimmelpfennig et al., *Quat. Geochr.* 4, 441-461, 2009; Marrero et al., *Quat. Geochr.* 31, 160-187, 2016). However, several drawbacks still affect these commonly used calculators, such as oversimplification of the muon production model, which can be inaccurate for depth profile simulations, or the absence of choice regarding production rate parameters. Here, we present a new ^{36}Cl exposure calculator, which we are currently implementing in the existing cosmic-ray-exposure program CREp (crep.otelo.univ-lorraine.fr; Martin et al., *Quat. Geochr.* 38, 25-49, 2017). So far, CREp allows calculating ^{10}Be and ^3He surface exposure ages and provides the possibility to choose between global or locally and regionally calibrated production parameters of these nuclides from the ICE-D-calibration data base. Taking advantage of the most recently developed scaling, muon and low-energy neutron models, the CREp- ^{36}Cl calculator allows calculating surface exposure ages as well as depth profiles and provides several choices between scaling and muon models and production parameters.