

## **Calculation of weathering rates to critical loads for acidity of forest soils in the limestone**

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Weathering rate of soils is one of the important factors for calculating the critical loads for terrestrial ecosystem. So far, several methods have been agreed in European countries for the estimation of soil weathering rates and have been adopted for critical loads mapping. It is suggested in the mapping manual that the soils in the limestone area are assumed to have high weathering rates ( $>2\text{keq/ha/yr}$ ) on the assumption that the soils consist chiefly of calcite and/or dolomite. But the present study shows that the forest soils developed on the limestone area of Korea are composed mainly of quartz, illite, vermiculite, chlorite, etc. in the order of abundance as evidenced by X-ray diffraction (XRD) analysis. Calcite was not detected in the soil profile down to the depth of 1.05m. The soil profile was divided into 4 horizons for calculation of weathering rates using PROFILE model. Soil sample from each horizon was quantitatively analyzed by XRD. It turned out that the weathering rate of the profile is  $1.319\text{ keq/ha/yr}$ , which is much lower than the high rate ( $2.25 - 2.75$  or more) expected from the Mapping Manual. This result indicates that soils developed on the limestone area can have mineralogy quite different from the bed rocks and that the weathering rates of soils in the forest carbonate area are much lower than expected. Therefore, it is needed to estimate the soil weathering rates for calculation of critical loads in the carbonate rock area on the basis of a careful quantitative mineralogical analysis of soils.