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A variety of different methods have been used for the determination of inorganic soil SO_4^{2-} in the past, which makes it difficult to compare SO_4^{2-} contents of soils. Sulfate was extracted with the four commonly used extraction solutions 0.5 M NaHCO_3 , 0.02 M NaH_2PO_4 , 0.1 M NaCl and H_2O from A-, Bw- and Bs-horizons of six acid forest soils. 5 g of field moist soil were percolated with a flow rate of 5 ml/h and percolations were repeated as long as SO_4^{2-} was detectable in the percolate ($>0.5 \text{ mg SO}_4 \cdot \text{l}^{-1}$). NaCl and NaHCO_3 extracted highest amounts of total inorganic SO_4^{2-} in A-horizons, but NaHCO_3 caused analytical problems. NaHCO_3 and NaH_2PO_4 yielded highest amounts in B-horizons. With the exception of Bs-horizons more than 70% of the total inorganic SO_4^{2-} was H_2O -soluble. Thus, if H_2O -soluble SO_4^{2-} is defined as reversibly bound, the greater part of the inorganic SO_4^{2-} fraction can potentially be released, if SO_4^{2-} deposition decreases.

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