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## How many carboxyl groups does an average molecule of humic-like substances contain?

I. Salma and G. G. Láng

Eötvös University, Institute of Chemistry, Budapest, Hungary

**Abstract.** The carboxyl groups of atmospheric humic-like substances (HULIS) are of special interest because they influence the solubility in water, affect the water activity and surface tension of droplets in the air, and allow formation of chelates with biologically active elements. Experimentally determined abundances of the carboxyl group within HULIS by functional group analysis are consistent with our knowledge on the average molecular mass of HULIS if the number of dissociable carboxyl groups is assumed to be rather small. The best agreement between the average molecular mass derived from the existing abundance data and the average molecular mass published earlier occurs for assuming approximately one dissociable carboxyl group only. This implies that HULIS can not be regarded as polycarboxylic acid in diluted solutions. The average molecular mass of HULIS derived from our electrochemical measurements with the assumption of one dissociable carboxyl group or equivalently, one dissociable sulphate ester per molecule ranges from 250 to 310 Da. It was concluded that HULIS are a moderately strong/weak acid with a dissociation constant of about  $pK=3.4$ , which fits well into the interval represented by fulvic and humic acids. The mean number of dissociable