



Assumptions and limitations in modeling atmospheric ionization by precipitating particle

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Atmospheric ionization is partially caused by precipitating particles. In order to model the effects these particles have to be detected, differentiated by species and energy, and interpolated to a global coverage. Pitch angle distributions need to be estimated, full energy spectra to be fitted, fit functions to be presumed, energy depositions to be calculated, and depositions to be transformed into ion pair productions.

Within the modeling process different assumptions have to be made, some with just small, some with tremendous impact on the results.

Here, an overview on the main assumptions within the complete modeling process -and their impact on the ionization rates- will be given. It will be assessed whether assumptions are well-founded, still in discussion or lacking a serious foundation but being the best estimation available. As far as possible error limits for different assumptions will be given and competing solutions will be compared.

The main idea is to sensibilize the users of ionization rates for the immanent uncertainties on the one hand and to focus the ionization community on the aspects/assumptions that create them on the other hand.

Some aspects will be sketched using the Atmospheric Ionization Module OSnabrück (AIMOS). However, most of the implications will be generally applicable for all kind of ionization models that are based on particle measurements.