On the modeling of nitric oxide diurnal variations in the mesosphere and lower thermosphere under undisturbed conditions

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A theoretical model of the nitric oxide diurnal variations in the height range from 50 to 150 km of the undisturbed terrestrial upper atmosphere has been developed. Besides the other constituents of the odd nitrogen chemical family the model also incorporates primary positive ions that are formed by the ionizing solar UV-radiation and odd oxygen and odd hydrogen minor species families. A comparison of the calculations carried out for various model input parameters with the published NO number density measurements under undisturbed conditions in the lower thermosphere and upper mesosphere indicates the presence in this height region of some additional unidentified chemical source of nitric oxide that has not been accounted for in any of the existing theoretical models.