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Assessment of radiation budget in a regional climate model

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It was often shown that regional climate models are useful instruments for climate research, but in most cases it was not shown in terms of the radiation budget. The longwave and shortwave components of the radiation budget describe the sources and sinks of energy of the system earth-atmosphere. So they are one of the most important meteorological parameters for climate modeling. In the framework of this study longterm simulations over Europe with the regional climate model CLM were compared with radiation datasets from GEWEX/SRB and ERA40. At first uncertainties of these quasi-observational datasets are discussed. To detect differences in the data, different kinds of comparisons were done. These comparisons show regionally differentiated partly strong differences of net radiation at the surface as well as at top of atmosphere. For example a strong North-South gradient for shortwave net radiation or clear annual varying differences between the Baltic and Mediterranean sea, can be seen. This paper refers these deviations to differences in cloud cover and surface albedo in the CLM simulations in comparison to the GEWEX/SRB and ERA40 datasets. The relative importance of surface albedo and cloud cover errors is subsequently discussed.