A bulk similarity approach in the atmospheric boundary layer to determine regional sensible heat fluxes

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Profiles of temperature in the atmospheric boundary layer (ABL) were used with surface temperature measurements to determine regional sensible heat flux by means of transfer parameterizations on the basis of bulk similarity. The profiles were measured by means of radiosondes and the surface temperatures were measured by an infrared radiation thermometry. In the present study, the similarity functions C in the ABL bulk similarity equation were calibrated with the FIFE (First ISLSCP (International Satellite Land Surface Climatology Project) Field Experiment) data, and values of surface sensible heat flux H determined by the ABL bulk similarity equation with the calibrated C-functions compared well with the reference values Hs. In the analysis, it was found that the FIFE-calibrated C-functions didn't produce good results with the two new data sets, but recalibrated C-functions with all three combined data sets produced similarly good results. With the C-functions and the parameterized scalar roughness length for sensible heat, H compared well with Hs for the only FIFE data set, and not as well for the other data sets.