



Directional irradiances and fractional clouds

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For large scale implementation of solar energy, better understanding of the directional and temporal variations in the solar resource is needed. This includes understanding the shading within a multiple row field of solar panels and how this affects the electricity or heat production. We have studied directional irradiances measured simultaneously from 16 downward directions at 1 minute temporal resolution. Also, we have performed measurements of the variations in the field of view across individual solar heating panels in the operational solar district heating plant in Hedehusene in Denmark. By combining a model of directional diffuse irradiances with the field of view variation across a solar panel in a solar panel field we can quantify the effect of shading of diffuse irradiances on the heat flow from the panel.