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Assessment of cloud cover in climate models and reanalysis databases with ISCCP over the Mediterranean region

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Clouds are an important regulator of climate due to their influence on the water balance of the atmosphere and their interaction with solar and infrared radiation. At any time, clouds cover a great percentage of the Earth's surface but their distribution is very irregular along time and space, which makes the evaluation of their influence on climate a difficult task. At present there are few studies related to cloud cover comparing current climate models with observational data.

In this study, the database of monthly cloud cover provided by the International Satellite Cloud Climatology Project (ISCCP) has been chosen as a reference against which we compare the output of CMIP5 climate models and reanalysis databases, on the domain South-Europe-Mediterranean (SEM) established by the Intergovernmental Panel on Climate Change (IPCC) [1]. The study covers the period between 1984 and 2009, and the performance of cloud cover estimations for seasons has also been studied. To quantify the agreement between the databases we use two types of statistics: bias and SkillScore, which is based on the probability density functions (PDFs) of the databases [2]. We also use Taylor diagrams to visualize the statistics.

Results indicate that there are areas where the models accurately describe what it is observed by ISCCP, for some periods of the year (e.g. Northern Africa, for autumn), compared to other areas and periods for which the agreement is lower (Iberian Peninsula in winter and the Black Sea for the summer months). However these differences should be attributed not only to the limitations of climate models, but possibly also to the data provided by ISCCP.

References
[1] Intergovernmental Panel on Climate Change (2007) Fourth Assessment Report: Climate Change 2007: Working Group I Report: The Physical Science Basis.
[2] Ranking the AR4 climate models over the Murray Darling Basin using simulated maximum temperature, minimum temperature and precipitation. Int J Climatol 28:1097-1112

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