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Relating Convective System Durability with Vertical Wind Profile extracted from NCEP/NCAR Reanalysis

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Various theoretical models focus on the relationship between wind characteristic and convective system durability. Yet in 1988, Rotuno, Klemp and Weisman state that an optimal live length result from a balance between cold pool thickness and low level wind shear. However these models require a knowledge of local upper air environment and these data are scarcely available for climatological studies.

Our presentation address the issue of relating the wind vertical profile extracted from reanalysis fields with a convective system type index. Whereas getting wind data from the NCEP/NCAR database is a straightforward task, assessing convective system extension from geostationary satellite data raise both methodological and practical issues. In a climatological view of convective systems, the initiating steps can be be neglected and a tropopause temperature threshold could be sufficient to delineate systems area. Thus the dynamic parameters between two consecutive would be obtained by a maximum recovery algorithm. But this simple method has to be enhanced to avoid two drawbacks: a rough system area overestimation due to the trailing cirrus and an over-segmentation of active systems. To mitigate the first bias a watershed image segmentation is carry out and the patches with a negative growing rate are eliminated. In order to properly join different parts of the same system, a 3D labeling algorithm has been implemented. Moreover, as motion retrieval methods are based on overlapping area, spatial and temporal resolution imports and full data processing require optimized computation procedures.
Based on these methods, we have produced a base of convective systems trajectory based on MSG and Meteosat data. To avoid parallax effects only the central part of the acquisition disk has been considered. System extension and duration has been compared with wind shear in amplitude and direction. The preliminary results shows a global effect consistent with simulation models, but statistical data significance has yet to be investigated.