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A Climatology of Greek Supercells

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Of all types of thunderstorms, supercells are the overall least common in Greece. Indeed, only 40 such storms were recorded during the last 30 years, with an increasing rate though. Their conceptual model was developed based mainly on the features they exhibited in the Great Plains of the United States. The need for a careful adaptation of this model, suitably modified, arises from Greece's special climatic and topographic characteristics. Supercells were identified during radar watch in the frame of the Greek National Hail Suppression Program, running since 1984. The radar coverage comprises most parts of Northern and Central Greece, where convective storms occur during the warm season.

Mountain chains seem to act as source regions of supercells. Their track is oriented towards east, northeast and southeast for the 92% of the cases, while the synoptic patterns favoring their initiation are the southwest flow and a shortwave trough passage. The jet stream is also present in most cases. Supercells were categorized according to the distance they traveled and their lifetime, in short- and long-track and short- and long-lived respectively. Yearly, monthly and hourly distributions of supercell occurrence were also examined, as well as other physical features like speed of motion, maximum reflectivity and top, size of maximum hailstone produced, etc. Hodographs, stability indices and severe thunderstorm indices, derived from representative soundings, were also taken into account and appropriate thresholds and ranges were established. The interplay between buoyancy and shear conditions seem to be of special interest, as well as the capping inversion in the prestorm environment. Finally, radar signatures of their anatomy were verified, such as hook echo, bounded weak echo region and motion deviating from mean tropospheric wind. The existence of these last features for some time during storm lifetime may serve as a definition of supercells in Greece.