ABSTRACT

AN INVESTIGATION OF ISOLATED THUNDERSTORMS OVER JAMAICA CAUSED BY DAYTIME HEATING

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Isolated convective thunderstorms are common in the island of Jamaica. Lightning strikes pose a serious threat to industry and personal livelihood and safety. For this reason it is important to predict the occurrence of these events. This, however is not a simple task given the multitude of factors which affect the origin of thunderstorms. In this paper, the impact of thermodynamic variables and stability indices on thunderstorm occurrence in Jamaica has been assessed, and the predictive power of the significant variables has also been examined.

The data set for the study used sixty days from years 1998 and 1999. The target period was between 1600 UTC and 2200 UTC (the peak period for air-mass type thunderstorms) during the months of October, November, and December. The focus was on 'air-mass', or isolated convective thunderstorms; as such, the days of significant weather were omitted from the study.

Correlations were found between several of the chosen indices and lightning occurrence. The most highly correlated was the 500mb Dew Point Depression, with a correlation coefficient of -0.61. Lifted index (-0.60), and 850 Equivalent Potential Temperature (0.56) were second and third respectively.

Logistic regression was used to develop a forecast model that would differentiate between days with significant electrification (for lightning activity) as opposed to days with insignificant electrification.

Keywords: André De'Crecy Coy; Jamaica; Lightning; Isolated Thunderstorms; stability indices; air-mass thunderstorms; logistic regression; Jamaica; forecast model; Lifted Index; 850 Equivalent Potential Temperature; 500mb Dewpoint Depression