Precipitation Evaluation of the North Dakota Cloud Modification Project

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ABSTRACT

The North Dakota Cloud Modification Project (NDCMP) is a state-managed cost-sharing program with the primary goal of reducing crop hail damage and a secondary goal of increasing rainfall in western North Dakota that began in 1976 and continues to the present. The impact of NDCMP cloud seeding operations on precipitation in the project area over the period 1977 through 2018 is studied using rain gauge observations and an exploratory historical target/control statistical analysis. Three counties where seeding was conducted each year are designated as target areas and paired with control areas that encompass neighboring counties where little or no seeding has occurred. Monthly and seasonal (June-August) area precipitation amounts for targets and controls is obtained from averages of available daily rain gauge measurements. The relationship between target and control precipitation is compared for the era 1950-1975, before the NDCMP began, and the NDCMP era from 1977-2018. Two target areas, McKenzie, and Bowman are paired with four control regions and Ward is paired with one. Six of eight McKenzie and Bowman target/control pairs have target/control ratios indicating higher precipitation in target areas during the NDCMP. Additionally, 2 of the 8 indicated enhancements have a 95% statistical chance of being greater than 1.0. The Ward target/control comparison indicates no enhancement. The average of all nine target/control enhancements is 1.03.