

Predicting Winter Fog over Complex Terrain using Machine Learning

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UUCS-24-002

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16 April 2024

Abstract

Fog forms in high-elevation complex terrain as frequently as it does over bodies of water but is less understood and harder to predict. Forecasting winter cold fog over complex terrain is particularly difficult due to the complex interactions between land, water, snow cover, and atmospheric conditions in the process of fog formation. Traditional physical and numerical models have a limited ability to represent various conditions associated with fog formation; thus, fog prediction remains a challenge in weather prediction. This study aims to evaluate the effectiveness of machine learning methods in predicting winter fog over complex terrain, specifically the city of Heber in northern Utah. We utilize 10 years of surface meteorological observations. Emphasis will be placed on examining various baseline methods for their effectiveness in machine learning to help produce meaningful forecasts.