Near Space and Urban Images as an Alternate Method of Measuring Atmospheric Turbidity

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Using images to determine turbidity levels of the atmosphere is a relatively new, however effective process. Northern Utah faces an atmospheric pollution problem for which we lack a comprehensive understanding. This study will focus on the analyses of digital images to determine a measurement for the number of particulates in the air, the turbidity. The data will be collected in two different scenarios. The first is a controlled experiment conducted inside of an aquarium tank in order to reduce the myriad variables in the troposphere. The second is a flight camera system oriented facing the ground, lifted by a high-altitude balloon.

The pictures taken from both scenarios will be analyzed using a modulation transfer function to determine a resolution value based on a high contrast feature located in the image. This method is one of a growing number of alternatives to accurately measure atmospheric pollution in urban areas. It is designed to reduce cost, overhead, and complication of previous methods by using easily accessible high-quality images. In the future this procedure could be used as a back-end calculation for a computer application, accessible to millions to measure local air quality.