

# **Comparing NDVI between Linear Mixing and Non-Linear Mixing and Their Application in Forest Cover Change Study**

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## **ABSTRACT**

NDVI is commonly used as a measure of land surface greenness based on the assumption that NDVI value is positively proportional to the amount of green vegetation in an image pixel area. This is true when the spectral mixing process of green vegetation and background material is physically linear. But many researchers have reported in the literature that non-linear spectral mixing exists in many cases. If the spectral mixing is non-linear, NDVI may not correctly represent the greenness or amount of green vegetation in the image pixels.

In this paper, we first theoretically studied the relationship between linear-mixture-derived NDVI and non-linear-mixture-derived NDVI. Then based on in-situ spectral data, we established the quantitative relationship between both NDVIs which can be used to correct the non-linear-mixture-derived NDVI to linear-mixture-derived NDVI.

We applied both corrected NDVI and uncorrected NDVI to a geographic region in State Virginia to study the forest cover change between 1992 and 1995 for the NASA-funded project-VAccess /MAGIC using AVHRR data. We compared the different results about forest cover change detection in State of Virginia including the deforestation and reforestation process.

This study is applicable to any other regional or global applications in deforestation and forest regeneration research, any NDVI related research and spectral mixture analysis.