

# **CORRELATING SOIL ELECTRO-CONDUCTIVITY AND SATELLITE MULTISPECTRAL IMAGERY DERIVED INDICES FOR WELL SITES IN NORTHERN BC**

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## **ABSTRACT:**

Petroleum companies are monitoring environmental impact more rigorously under industrial regulation criteria nowadays. The soil apparent electro-conductivity is an important indicator to map environmental changes. It is normally conducted and measured by the on-site electro-magnetic (EM) surveys, which are accurate but time-consuming, cost-demanding, and limited to small areas. With the advance of high-resolution satellite missions, the multispectral imagery, particularly the Worldview-2 new 8-band imagery, provides a detailed insight on the land classification and environmental monitoring applications. In this paper, we worked on the correlation and optimization of the relations between soil electro-conductivity survey data and high-resolution multispectral imagery derived reflectance and indices, for instance, Normalized Difference Vegetation Index (NDVI) and Normalized Difference Soil Index (NDSI). The raw high-resolution 8-band Worldview-2 imagery acquired in an area of northern BC, Canada, was pan-sharpened to its higher resolution of 0.5m and then the imagery was atmospherically corrected and geo-corrected to the map projection of EM survey data. A 2D correlation and multi-linear regression analysis was conducted for these two datasets in the areas of the well sites. The preliminary results showed that the multi-linear combination of different bands had the highest correlation with the soil electro-conductivity data. The succession of the correlation analysis demonstrates a potential process of spatial variability monitoring by comparing the changes of the derived indices from time-lapse high resolution multi-spectral satellite imagery. This approach using satellite multi-spectral imagery is time-efficient, cost-effective, and can be applied to large areas of well sites.

**KEY WORDS:** Correlation, Electro-Conductivity, Multispectral Imagery, NDVI, NDSI

[Final poster may be accessed here.](#)

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