ABSOLUTE NDVI VERSUS RELATIVE NDVI

Absolute Vegetation Indices

In addition to Digital Numbers and irradiances as discussed in the calibration section, reflectivities can also be computed using GEMS. In order to compute reflectivities, either an incident light sensor or ground based reflectance targets with known spectral reflectivities are used. Sentek uses NIST traceable ground reflectance targets and will be offering an incident light sensor as an option in the near future. The irradiance of an image pixel may be divided by the irradiance of a ground based reflectance target (i.e. nearby reflectance target) and then multiplied by the known reflectivity of the reflectance target (i.e. in the spectral band that is being imaged) to produce the reflectivity of the image pixel. Alternatively, an incident light sensor can replace the function of the ground based reflectance targets but has to be able to be utilized properly in software.

Camera digital numbers (DN's), irradiances, and reflectivities have been used by researchers to compute vegetation indices and the relationships of these indices to quantities of interest. When reflectivities are used to compute vegetation indices, the indices are often called absolute vegetation indices.

Absolute vegetation indices are of value when comparing results across different sensor platforms and useful for comparison with the scientific literature. Absolute indices are also of value when evaluating changes in vegetation indices across sites or over multiple seasons.

Relative Vegetation Indices

In many applications, relative or normalized vegetation indices are of value. Normalized vegetation indices are computed by dividing the computed vegetation index by a normalization constant. Normalization can make features in an image more visible than the same features in a non-normalized image.

One advantage of normalized indices is that they can normalize out seasonal variability due to different environmental conditions (i.e. different precipitation, temperature/growing degree days, fertilization, pests, disease etc.). The normalization constant represents the best performance that is possible for the current growing season given all the other factors that have affected growth during the season.

In summary, the Sentek GEMS system provides the information to enable an end user to use DN's, irradiances or reflectivities in vegetation index calculations. It also enables absolute and relative vegetation index calculation.