

## **Polarization remote sensing: New method for the earth observation and climate change**

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### **Abstract**

Through years of observation and measurements, scientists have found that terrestrial system is in trouble. In order to understand earth and the changing climate better and to construct models of terrestrial system, Polarization Remote Sensing (PRS) maybe a useful tool. Experiments have showed that solar light reflected by natural surface and atmospheric particle is partly polarized. The reflected solar radiation is measured by a satellite/airplane-borne sensor. That means the digital number value (DN value) contains both the natural surface and background's information and it is quite difficult to extract useful information from DN value. According to our experiments and analysis in the past eight years, we found that this problem can be solved possibly. We have already 1) built up partial PRS theory and PRS spectral database which contains traditional surface objects' PRS spectral, 2) explored the influences of sky polarization pattern and neutral points, thus make extracting useful information from DN value possible, 3) constructed airplane-borne sensor calibration field and studied polarized hyperspectral pattern, these can be used to evaluate the potential usefulness of the proposed polarized hyperspectral satellite-borne sensors. Collaborations with Chinese scientists and global scientists have demonstrated our PRS theory is quite useful. 1) Collaborations with NOAA National Calibration Center proved that PRS can be helpful to Luna radiance based satellite-borne calibration. 2) Collaborations with Boston University suggested that PRS can broaden our understanding of terrestrial ecosystem. 3) Collaborations with Chinese Academy of Science have obtained solar shine polarized spectral, the result was published on ApJ Letter.

### **Biography**

Lei Yan has completed his Ph.D. from Tsinghua University and postdoctoral studies from Peking University School of Earth and Space Science. He is the Director of Beijing Key Lab of Spatial Information Integration & Its Applications. In the past 10 years, more than 240 articles are published, about 30 of them are indexed by SCI and 80 are indexed by EI. He is one of the "Hundred Talents" of Changchun Institute of Optics and Fine Mechanics. His research on PRS was awarded as the first Award for Natural Science of Beijing in 2012.