Satellite Atmosphere correction & Land Surface Applications

Calibration, Validation of Satellites Products, Atmospheric Corrections and Radiative Transfer for science applications

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Second Simulation of a Satellite Signal in the Solar Spectrum vector code

Introduction

The 6S code is a basic RT code used for calculation of lookup tables in the MODIS atmospheric correction algorithm. It enables accurate simulations of satellite and plane observation, accounting for elevated targets, use of anisotropic and lambertian surfaces and calculation of gaseous absorption. The code is based on the method of successive orders of scatterings approximations and its first vector version (6SV1), capable of accounting for radiation polarization. It was publicly released in May, 2005.

• Scalar (ignoring the effects of polarization).
• Fixed number of scattering angles (83), used for the specification of an aerosol phase function.
• 10 node wavelengths.
• Fixed number of calculation layers (26) and angles (48).
• Default exponential vertical aerosol profile.

• Several new subroutines, simulating measurements of the ALI, ASTER, ETM, HYPBLUE, VGT, and VIIRS instruments, have been integrated into the the vector 6S. The spectral response curves for all these instruments can be found in the 6S manual, version 3. The new subroutines were developed by Dr. T. Miura, University of Hawaii at Manoa, Honolulu, USA. Currently, the 6S list of satellite instruments include:

AATSR	ALI	ASTER	AVHRR	ETM	GLI	GOES
HRV	HYPBLUE	MAS	MERIS	METEO	MODIS	MISS
POLDER	SeaWiFS	TM	VIIRS	VGT		

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Publications

Vermote, E.F., Tanré, D., Deuzé, J.L., Herman, M., & Morcrette, J.-J. (1997), Second Simulation of the Satellite Signal in the Solar Spectrum, 6S: An Overview (https://ieeexplore.ieee.org/document/581987), IEEE Transactions on Geoscience and Remote Sensing, Vol. 35, No. 3, p. 675-686.

Svetlana Y. Kotchenova, Eric F. Vermote, Raffaella Matarrese, and Frank J. Klemm, Jr (2006)."Validation of a vector version of the 6S radiative transfer code for atmospheric correction of satellite data. Part I: Path radiance" (https://doi.org/10.1364/AO.45.006762), Optical Society of America, APPLIED OPTICS, Vol. 45, Issue 26, pp. 6762-6774

Svetlana Y. Kotchenova and Eric F. Vermote (2007). "Validation of a vector version of the 6S radiative transfer code for atmospheric correction of satellite data. Part II. Homogeneous Lambertian and anisotropic surfaces" (https://doi.org/10.1364/AO.46.004455), Optical Society of America, APPLIED OPTICS, Vol. 46, Issue 20, pp. 4455-4464
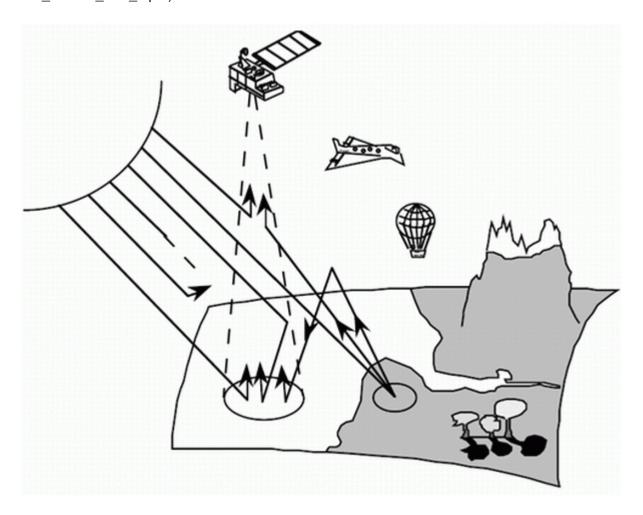
User Manual

This manual presents a modified version of the previous scalar 6S manual. For the user's convenience, the format and style of this new manual have been kept as close as possible to those of the previous version. The general information about the code, example input and output files, and detailed flow charts reflecting the structure of the code are presented in Part 1. The description of the code subroutines is provided in Parts 2 and 3.

User guide links:
Part 1 (files/6S/6S_Manual_Part_1.pdf) | Part 2 (files/6S/6S_Manual_Part_2.pdf) | Part 3 (files/6S/6S_Manual_Part_3.pdf)

6S Version

6SV2.1(2014)

Download 6SV2.1 (files/6S/6sV2.1.tar)

• Vector (accounting for polarization).
• Ability to vary the number of scattering angles (up to 100).
• 20 node wavelengths.
• Ability to change the number of calculation layers and angles.
• Default exponential + user-defined (up to 50 layers in the height range 0-100 km) vertical aerosol profiles.

Important Note :

We apologize for the inconvenience but the 6S interface, that allowed to get interactive simulations, is currently unavailable.

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