Infrared Sounder Pre-Processing (IRSPP)

Version 1.3 Release Notes

28 October 2024

Introduction

The Infrared Sounder Pre-processor (IRSPP) is a software package designed to process hyperspectral sounder data from the IRS instrument on the MTG-S1 and MTG-S2 satellites. The package is designed primarily for applications in numerical weather prediction (NWP). The first version (v1.0) was released in March 2022.

IRSPP version 1.3 is an updated release, compatible with the pre-launch simulated test data released by EUMETSAT in July 2024, see https://user.eumetsat.int/resources/user-guides/mtg-test-data.

Changes in IRSPP v1.3

The main changes in this release are as follows:

• Allow for format changes in the July 2024 test data

• Support for HT-FRTC has been withdrawn as this is no longer supported in RTTOV. Instead, PC-RTTOV is supported, i.e. IRSPP can transform to PC scores that are compatible with the PC-RTTOV eigenvectors.

• Update the IRS output BUFR sequence.

• New set of test cases.

Reference documents

The IRSPP documents are listed in Table 2. The IRSPP User Manual has been updated to reflect the changes made in IRSPP v1.3.

Table 2: IRSPP documentation

Doc reference	Title	Version / year	Status
NWPSAF-MO-UD-053	IRSPP User Manual	1.4 / 2024	Updated

NWPSAF-MO-DS-037	IRSPP Product Specification	1.0 / 2018	Published
NWPSAF-MO-DS-037	IRSPP Top Level Design	1.4 / 2022	Published

Note that the User Manual is the main document that users should refer to, as it includes details of how to install the software, how to run the software and the scientific principles.

The documents can be accessed from the NWP SAF web site at

https://nwp-saf.eumetsat.int/site/software/irspp/

Package files

The IRSPP package files are listed in Table 3.

Table 3: IRSPP v1.3. package files

File name	Size (bytes)	Purpose
Release_note_IRSPP_v1.3.pdf		This document
IRSPP_v1.3_source.tgz	40554	Source code
IRSPP_v1.3_exec.tgz	24354500	Executables and dynamic libraries (built on Red Hat 7.9)
		- OPTIONAL
IRSPP_v1.3_test_cases.tgz	528226782	Updated to use latest EUMETSAT PC score product for LAC4 and an SSS file.

Access to the IRSPP v1.3 code and executables is via the "software downloads" tab on the NWP SAF web site. User registration is required.

Users have the choice of building the package from source or using the supplied Red Hat 7.9 executables, if their system is compatible. See the User Manual for further information about compatibility.

The test cases are accessible from https://nwp-saf.eumetsat.int/downloads/irspp_testcases/

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https://nwp-saf.eumetsat.int/site/software/licence-agreement/.

System requirements

IRSPP has been tested on systems compatible with 64-bit CentOS7 and CentOS8. It would be expected to work on other Linux distributions, provided support for the dependency libraries exists. The dependency libraries include:

- ecCodes, distributed by ECMWF

- netCDF (Fortran and C interfaces)

- hdf5 (with Fortran enabled)

- LAPACK

For building IRSPP from source, a Fortran90 compiler is required. The recommended F90 compilers are gfortran and ifort.

The supplied test case scripts are based on Bash shell.

Standard Unix utilities (including gmake, ar, tar) are used.

There are no particular requirements on disk space (IRSPP takes up only about 300MB when built). But you will need space for the input and output IRS data files. The PC product occupies approximately 33MB per 10 second dwell. The instrument records 280 dwells per hour (see https://user.eumetsat.int/resources/user-guides/mtg-irs-level-1-data-guide), so throughput would be expected to be 220GB per day.

The test cases include a README file that gives typical run times on a system with 8 GB of memory and 4 processor cores. This could be considered a minimum configuration. IRSPP v1 does not include parallelisation within the Fortran code, but it is possible to improve throughput by processing several dwells simultaneously, provided the system has sufficient memory and cores.

Installing IRSPP

For instructions on installing IRSPP, please see sections 2 and 3 of the IRSPP User Manual. If you are building IRSPP from source, two scripts are supplied to assist the process:

- *install_dependencies.sh* – downloads the necessary dependency libraries and builds them

- *configure_irspp.sh* – prepares the necessary makefiles, ready for the user to run "make".

Running the test cases

The test cases are documented in section 9 of the User Manual and are distributed as a single gzipped tar file.

The availability of new test cases will be communicated to users via the IRSPP web page and NWP SAF news announcements.

User feedback

If you encounter a problem, or have suggestions for improvements, please use the NWP SAF Helpdesk, at https://nwp-saf.eumetsat.int/site/help-desk/.