

Infrared Sounder Pre-Processing (IRSPP)

Version 1.4 Release Notes

16 June 2026

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 1.4 is an updated release, compatible with (i) simulated test data TD-528 published Jan 2025 at EUMETSAT - User Portal, and (ii) NRT dissemination of PC scores in netCDF on EUMETCast.

Changes in IRSPP v1.4

A detailed list of changes is shown in Table 1.

Table 1: Changes in IRSPP v1.4

Changed file	Purpose of change
setup scripts install_dependencies.sh and configure_irspp.sh (and scripts these source)	Consistency with other NWP SAF preprocessing packages (e.g. AAPP-SG). Improvements include: - new `make install` step; - supporting use of dependencies from pre-existing installations, central installations or conda environment, and improved checks that dependencies have been built correctly; - Including the dependency bin directories in the PATH set by runtime script irspp_env.sh; - Portability fixes for RHEL7 servers.

Changed file	Purpose of change
irs_main.f90 irs_average_pcscores.f90 irs_average_spectra.f90 irs_data_mod.f90 irs_read_eigenvectors_hdf5.f90 irs_write_bufr.f90 Makefile meansd_2d.f90	- Add ability to perform spatial averaging of spectra and PC scores in order to potentially reduce noise. - Support hdf5 dataset names in latest IRS test data, as well as the old ones. - Add facility to skip local BUFR descriptors, as requested by ECMWF.
format_ev.f90 irs_generate_pcs.f90 irs_main.f90 irs_sss_filtering.f90 irs_transform_pcs.f90 irs_read_eigenvectors_hdf5.f90 irs_read_irsattr_hdf5.f90 irs_read_irsdata_hdf5.f90 irs_read_noise_hdf5.f90 irs_write_eigenvectors_hdf5.f90	Fix run-time failure affecting ifort-compiled executables by ensuring that h5close_f is only called once.
irs_read_irsdata.f90	Correct netCDF lat/lon missing value.
Added: irs_BUFR_display_rr.py and irs_netcdf_display_rr.py	New python plotting scripts for displaying netCDF and BUFR data
Added version.yaml, COPYRIGHT and LICENCE.md	

Reference documents

The IRSPP documents are listed in Table 2. The IRSPP User Manual has been updated to reflect the changes made in IRSPP v1.4.

Table 2: IRSPP documentation

Doc reference	Title	Version / year	Status
NWPSAF-MO-UD-053	IRSPP User Manual	1.6 / 2026	Updated
NWPSAF-MO-DS-037	IRSPP Product Specification	1.0 / 2018	Published
NWPSAF-MO-DS-043	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 v1.4. package files

File name	Size (bytes)	Purpose
Release_note_IRSPP_v1.4.pdf		This document
IRSPP_v1.4.tgz	64600	Source code
IRSPP_v1.4_exec.tgz	24110052	Executables and dynamic libraries (built on RHEL 9.7)
- OPTIONAL		
IRSPP_v1.4_test_cases.tgz	253390408	New test case using real in-orbit data matching the time and region of the Hayli-Gubbi eruption (2025/11/23). The previous test cases released with IRSPP v1.3, exercising other parts of IRSPP, are still available and may be run if required.

Access to the IRSPP v1.4 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 Enterprise Linux (RHEL) 9.7 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/

License

To use this software, users need to have agreed to the terms of the NWP SAF License Agreement. The License Agreement is displayed when a user is logged into the NWP SAF web site and chooses to change software preferences. It can also be viewed here:

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

System requirements

IRSPP has been tested on systems compatible with 64-bit CentOS9. Additionally, less extensive testing has been carried out for CentOS7 and CentOS8. IRSPP 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://www.eumetsat.int/mtg-infrared-sounder>), 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 section 2 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” and “make install”.

For details on using these scripts, see the User Manual.

Running the test cases

The test cases are documented in section 8 of the User Manual; each set are distributed as a single gzipped tar file, available from: https://nwp-saf.eumetsat.int/downloads/irspp_testcases .

This release is compatible with the test cases released with IRSPP v1.3 (IRSPP_v1.3_test_cases.tgz), which are based on full-disc simulated IRS data that was released by EUMETSAT in November 2022 (full spectra) and December 2023 (PC scores): see <https://user.eumetsat.int/resources/user-guides/mtg-test-data> .

These are supplemented by an additional set of test cases available from IRSPP_v1.4_test_cases.tgz, which are based on real in-orbit data from the day and region of the Hayli-Gubbi eruption (2025/11/23).

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

Version control

Contents of the IRSPP_version.txt file released as part of IRSPP v1.4:

Name: IRSPP Version: 1.4 Release date: 2026-06-16 12:28:19 +0000 (Tue, 16 Jun 2026)

This refers to the GitHub repository held at the Met Office.

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/>.