


# **NWP SAF**

## **NWPSAF 1D-Var v1.0**

### **Release Note**

Version 0.3

29<sup>th</sup> May 2014

The EUMETSAT Network of Satellite Application Facilities	 <b>NWP SAF</b> Numerical Weather Prediction	NWPSAF 1D-Var v1.0 Release Note	Doc ID : NWPSAF-MO-UD-031 Version : 0.3 Date : 29/05/2014
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## NWP SAF 1D-Var Release Note

This documentation was developed within the context of the EUMETSAT Satellite Application Facility on Numerical Weather Prediction (NWP SAF), under the Cooperation Agreement dated 29 June 2011, between EUMETSAT and the Met Office, UK, by one or more partners within the NWP SAF. The partners in the NWP SAF are the Met Office, ECMWF, KNMI and Météo France.

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Change record			
Version	Date	Author/changed by	Remarks
0.1	17/02/14	P. Weston	First version, based on Met Office 1D-Var v3.5 release note
0.2	21/05/14	P. Weston	Modified after testing of NWPSAF 1D-Var v1.0 beta
0.3	29/05/14	P. Weston	Updated with new header, new document ID, new copyright statement and changed font following comments from B. Conway

The NWPSAF 1D-Var code is distributed in the tar file

NWPSAF\_1DVar\_v1.0.tar.gz

This file contains two subdirectories. The program and the files required by it are contained in the 1DVar\_v1.0/ folder. The documentation (including this document) is contained in the docs/ folder. The main user manual is

docs/nwpsaf-mo-ud-032\_NWPSAF\_1DVar\_Manual.html  
(but also see 1DVar\_v1.0/readme.txt).

Additional background information on the package may be found in

docs/nwpsaf-mo-ds-026\_top\_level\_design.pdf and  
docs/nwpsaf-mo-ds-025\_product\_specification.pdf.

The full listing of this package is as follows:

```

.:
1DVar_v1.0 docs

./1DVar_v1.0:
AIRS_COEFFS_DIR          IASI_COEFFS_DIR      Sample_Output
ATMS_COEFFS_DIR          SSMIS_COEFFS_DIR    Sample_Scripts
ATOVS_CLOUDY_COEFFS_DIR Sample_Background    readme.txt
ATOVS_COEFFS_DIR        Sample_Bmatrices     src
CrIS_COEFFS_DIR         Sample_Namelist      Sample_ObsFiles
GUI                      Sample_ObsFiles

./1DVar_v1.0/AIRS_COEFFS_DIR:
ChannelChoice_orig.dat  Rmatrix_orig

./1DVar_v1.0/ATMS_COEFFS_DIR:
ChannelChoice_orig.dat  Rmatrix_orig

./1DVar_v1.0/ATOVS_CLOUDY_COEFFS_DIR:
ChannelChoice_orig.dat  Rmatrix_orig

./1DVar_v1.0/ATOVS_COEFFS_DIR:
ChannelChoice_orig.dat  Rmatrix_orig

./1DVar_v1.0/CrIS_COEFFS_DIR:
ChannelChoice_orig.dat  Rmatrix_orig

./1DVar_v1.0/GUI:
ldvargui                Control_test.sh      GUI.py      Training.py  scale_bgerror.f90
Control_GUI.sh          Control_training.sh  Test.py     makefile     scale_oberror.f90

./1DVar_v1.0/IASI_COEFFS_DIR:
ChannelChoice_orig.dat  Rmatrix_orig


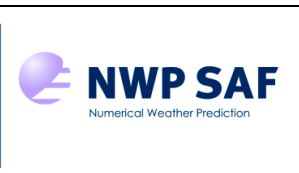
./1DVar_v1.0/SSMIS_COEFFS_DIR:
ChannelChoice_orig.dat  Rmatrix_orig

./1DVar_v1.0/Sample_Background:
BACKGROUND_43L.dat     BACKGROUND_54L.dat   truth_43L.dat  truth_54L.dat
BACKGROUND_51L.dat     BACKGROUND_with_CLW.dat truth_51L.dat

./1DVar_v1.0/Sample_Bmatrices:
Bmatrix_43L Bmatrix_51L Bmatrix_54L

./1DVar_v1.0/Sample_Namelist:
ControlData_AIRS.NL      Retrieval_AIRS_54L.NL      Retrieval_CrIS_51L.NL
ControlData_ATMS.NL     Retrieval_ATMS_43L.NL     Retrieval_CrIS_54L.NL
ControlData_ATOVS.NL    Retrieval_ATMS_51L.NL     Retrieval_IASI_43L.NL
ControlData_ATOVS_CLOUDY.NL Retrieval_ATMS_54L.NL     Retrieval_IASI_51L.NL
ControlData_CrIS.NL     Retrieval_ATOVS_43L.NL    Retrieval_IASI_54L.NL
ControlData_IASI.NL     Retrieval_ATOVS_51L.NL    Retrieval_IASI_CLOUDY_43L.NL

```

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```

ControlData_IASI_CLOUDY.NL   Retrieval_ATOVS_54L.NL       Retrieval_IASI_CLOUDY_51L.NL
ControlData_SSMIS.NL        Retrieval_ATOVS_CLOUDY_43L.NL Retrieval_IASI_CLOUDY_54L.NL
ControlData_emis_IASI.NL    Retrieval_ATOVS_CLOUDY_51L.NL Retrieval_SSMIS_43L.NL
Retrieval_AIRS_43L.NL       Retrieval_ATOVS_CLOUDY_54L.NL
Retrieval_AIRS_51L.NL       Retrieval_CrIS_43L.NL

```

**./1DVar\_v1.0/Sample\_ObsFiles:**

```

ObsFile_AIRS.dat   ObsFile_ATOVS.dat   ObsFile_CrIS.dat   ObsFile_SSMIS.dat
ObsFile_ATMS.dat  ObsFile_ATOVS_CLOUDY.dat  ObsFile_IASI.dat

```

**./1DVar\_v1.0/Sample\_Output:**

```

AIRS_RTTOV11   ATOVS_CLOUDY_RTTOV11   CrIS_RTTOV11   IASI_CLOUDY_RTTOV11
ATMS_RTTOV11   ATOVS_RTTOV11         IASI_RTTOV11   SSMIS_RTTOV11_CLW

```

**./1DVar\_v1.0/Sample\_Output/AIRS\_RTTOV11:**  
43L 51L 54L

**./1DVar\_v1.0/Sample\_Output/AIRS\_RTTOV11/43L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/AIRS\_RTTOV11/51L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/AIRS\_RTTOV11/54L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/ATMS\_RTTOV11:**  
43L 51L 54L

**./1DVar\_v1.0/Sample\_Output/ATMS\_RTTOV11/43L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/ATMS\_RTTOV11/51L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/ATMS\_RTTOV11/54L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/ATOVS\_CLOUDY\_RTTOV11:**  
43L 51L 54L

**./1DVar\_v1.0/Sample\_Output/ATOVS\_CLOUDY\_RTTOV11/43L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/ATOVS\_CLOUDY\_RTTOV11/51L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/ATOVS\_CLOUDY\_RTTOV11/54L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/ATOVS\_RTTOV11:**  
43L 51L 54L

**./1DVar\_v1.0/Sample\_Output/ATOVS\_RTTOV11/43L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/ATOVS\_RTTOV11/51L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/ATOVS\_RTTOV11/54L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/CrIS\_RTTOV11:**  
43L 51L 54L

**./1DVar\_v1.0/Sample\_Output/CrIS\_RTTOV11/43L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/CrIS\_RTTOV11/51L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/CrIS\_RTTOV11/54L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/IASI\_RTTOV11:**  
43L 51L 54L

**./1DVar\_v1.0/Sample\_Output/IASI\_RTTOV11/43L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/IASI\_RTTOV11/51L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/IASI\_RTTOV11/54L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/IASI\_CLOUDY\_RTTOV11:**  
43L 51L 54L

**./1DVar\_v1.0/Sample\_Output/IASI\_CLOUDY\_RTTOV11/43L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/IASI\_CLOUDY\_RTTOV11/51L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/IASI\_CLOUDY\_RTTOV11/54L:**  
Retrieved\_BTs.dat Retrieved\_Profiles.dat

**./1DVar\_v1.0/Sample\_Output/SSMIS\_RTTOV11\_CLW:**  
Retrieved\_BTs\_lwp.dat Retrieved\_Profiles\_lwp.dat  
Retrieved\_BTs\_qtotal.dat Retrieved\_Profiles\_qtotal.dat

**./1DVar\_v1.0/Sample\_Scripts:**  
test.sh test\_clw.sh

**./1DVar\_v1.0/src:**

Gen_ErrorReport.f90	NWPSAF_Minimize.interface
Gen_ErrorReport.interface	NWPSAF_Minimize_100.f90
Gen_FreeUnit.f90	NWPSAF_Minimize_100.interface
Gen_FreeUnit.interface	NWPSAF_Minimize_100ML.f90
Gen_GetUnit.f90	NWPSAF_Minimize_100ML.interface
Gen_GetUnit.interface	NWPSAF_Minimize_101.f90
Gen_MessageReport.f90	NWPSAF_Minimize_101.interface
Gen_MessageReport.interface	NWPSAF_OpenFile.f90
NWPSAFMod_Channellist.f90	NWPSAF_OpenFile.interface
NWPSAFMod_Constants.f90	NWPSAF_ProcessData.f90
NWPSAFMod_CovarianceMatrices.f90	NWPSAF_ProcessData.interface
NWPSAFMod_ObsInfo.f90	NWPSAF_Qtot_to_q_ql.f90
NWPSAFMod_Params.f90	NWPSAF_RMatrix_ChanSelect.f90
NWPSAFMod_RTTOV10.f90	NWPSAF_RMatrix_ChanSelect.interface
NWPSAFMod_RTTOV11.f90	NWPSAF_RTIASI_Interface.f90
NWPSAFMod_RTTOV8.f90	NWPSAF_RTIASI_Interface.interface
NWPSAFMod_RTTOV9.f90	NWPSAF_RTIASI_Interface_Dummy.f90
NWPSAFMod_RTmodel.f90	NWPSAF_RTTOV10_Interface.f90
NWPSAFMod_SatVapor.f90	NWPSAF_RTTOV10_Interface.interface
NWPSAF_1DVar.f90	NWPSAF_RTTOV10_Interface_Dummy.f90
NWPSAF_1DVar.interface	NWPSAF_RTTOV10_Interface_nonetcdf.f90
NWPSAF_1DVar_Driver.f90	NWPSAF_RTTOV11_Interface.f90
NWPSAF_AdditionalCost_Cloud.f90	NWPSAF_RTTOV11_Interface.interface
NWPSAF_AdditionalCost_Cloud.interface	NWPSAF_RTTOV11_Interface_Dummy.f90
NWPSAF_BandInverse.f90	NWPSAF_RTTOV11_Interface_nonetcdf.f90
NWPSAF_BandInverse.interface	NWPSAF_RTTOV7_Interface.f90
NWPSAF_BandMultiply.f90	NWPSAF_RTTOV7_Interface.interface
NWPSAF_BandMultiply.interface	NWPSAF_RTTOV7_Interface_Dummy.f90
NWPSAF_CO2Slice.f90	NWPSAF_RTTOV8_Interface.f90
NWPSAF_CO2Slice.interface	NWPSAF_RTTOV8_Interface.f90.orig
NWPSAF_Calculate_Cost_Function.f90	NWPSAF_RTTOV8_Interface.interface
NWPSAF_Calculate_Cost_Function.interface	NWPSAF_RTTOV8_Interface_Dummy.f90
NWPSAF_Channellist.f90	NWPSAF_RTTOV9_Interface.f90
NWPSAF_Channellist.interface	NWPSAF_RTTOV9_Interface.interface
NWPSAF_CheckIteration.f90	NWPSAF_RTTOV9_Interface_Dummy.f90
NWPSAF_CheckIteration.interface	NWPSAF_ReadHeaders.f90
NWPSAF_Check_Temperatures.f90	NWPSAF_ReadHeaders.interface
NWPSAF_Check_Temperatures.interface	NWPSAF_Read_Background.f90
NWPSAF_Cholesky.f90	NWPSAF_Read_Background.interface
NWPSAF_Cholesky.interface	NWPSAF_Read_ControlData.f90
NWPSAF_CloudCost.f90	NWPSAF_Read_ControlData.interface
NWPSAF_CloudCost.interface	NWPSAF_Read_Observations.f90
NWPSAF_CloudStructure.f90	NWPSAF_Read_Observations.interface
NWPSAF_CloudyOrNot.f90	NWPSAF_SatMatInv.f90
NWPSAF_CloudyOrNot.interface	NWPSAF_SatMatInv.interface
NWPSAF_DeAllocate.f90	NWPSAF_SetUpBackground.f90
NWPSAF_DeAllocate.interface	NWPSAF_SetUpBackground.interface
NWPSAF_Fastmodel_Interface.f90	NWPSAF_SetUpRetrievals.f90
NWPSAF_Fastmodel_Interface.interface	NWPSAF_SetUpRetrievals.interface
NWPSAF_Gastro_Interface.f90	NWPSAF_StratosExtrap.f90
NWPSAF_Gastro_Interface.interface	NWPSAF_StratosExtrap.interface
NWPSAF_Gastro_Interface_Dummy.f90	NWPSAF_TranslateDataIn.f90
NWPSAF_InitBmatrix.f90	NWPSAF_TranslateDataIn.interface
NWPSAF_InitBmatrix.interface	NWPSAF_TranslateDataOut.f90

NWPSAF\_InitRmatrix.f90  
NWPSAF\_InitRmatrix.interface  
NWPSAF\_Initialise.f90  
NWPSAF\_Initialise.interface  
NWPSAF\_IntegerSort.f90  
NWPSAF\_IntegerSort.interface  
NWPSAF\_LWP\_to\_Layers.f90  
NWPSAF\_LayerK\_to\_LWPK.f90  
NWPSAF\_Layers\_to\_LWP.f90  
NWPSAF\_Layers\_to\_LWP.interface  
NWPSAF\_Minimize.f90

NWPSAF\_TranslateDataOut.interface  
NWPSAF\_svp.f90  
NWPSAF\_svp\_deriv.f90  
QSAT.f90  
QSAT.interface  
RTIASI\_Arrays.f90  
RTIASI\_Direct.f90  
RTIASI\_K.f90  
RTIASI\_Subroutines.f90  
RTIASI\_rttvi.f90  
makefile

**./docs:**

AppendixA.html	Eqn2b.gif	img18.gif
AppendixB.html	Eqn3.gif	nwpsaf-mo-ds-025_product_specification.pdf
AppendixC.html	Main_CallingTree.gif	nwpsaf-mo-ds-026_top_level_design.pdf
AppendixD.html	Minimize_CallingTree.gif	nwpsaf-mo-tv-033_test_plan.pdf
AppendixE.html	Trans.gif	nwpsaf-mo-tv-034_portability.pdf
Cost_Gradient.gif	delyx.gif	nwpsaf-mo-ud-030_gui_user_guide.pdf
Eqn1.gif	img16.gif	nwpsaf-mo-ud-031_release_note.pdf
Eqn2a.gif	img17.gif	nwpsaf-mo-ud-032_NWPSAF_1DVar_Manual.html