



SAPP AT TSMS

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OUTLINE



- SAPP System
- Workflow And Features of SAPP
- SAPP vs HAPP
- Installation of SAPP At TSMS
- SAPP Related Activities
- Monitoring of SAPP



SAPP SYSTEM

❑ **Scalable Acquisition and Pre-Processing (SAPP) System** is a pre-processing software developed by ECMWF to use in pre-processing of the observations coming from different sources (e.g. GTS). The main functions of SAPP are as follows:

- Obtain observations from a multitude of sources (in the order of 200).
- Decode the different types of formats (e.g. BUFR, GRIB, HDF, netCDF, text).
- Apply initial quality control.
- Convert the observations into suitable format for the use of data assimilation.

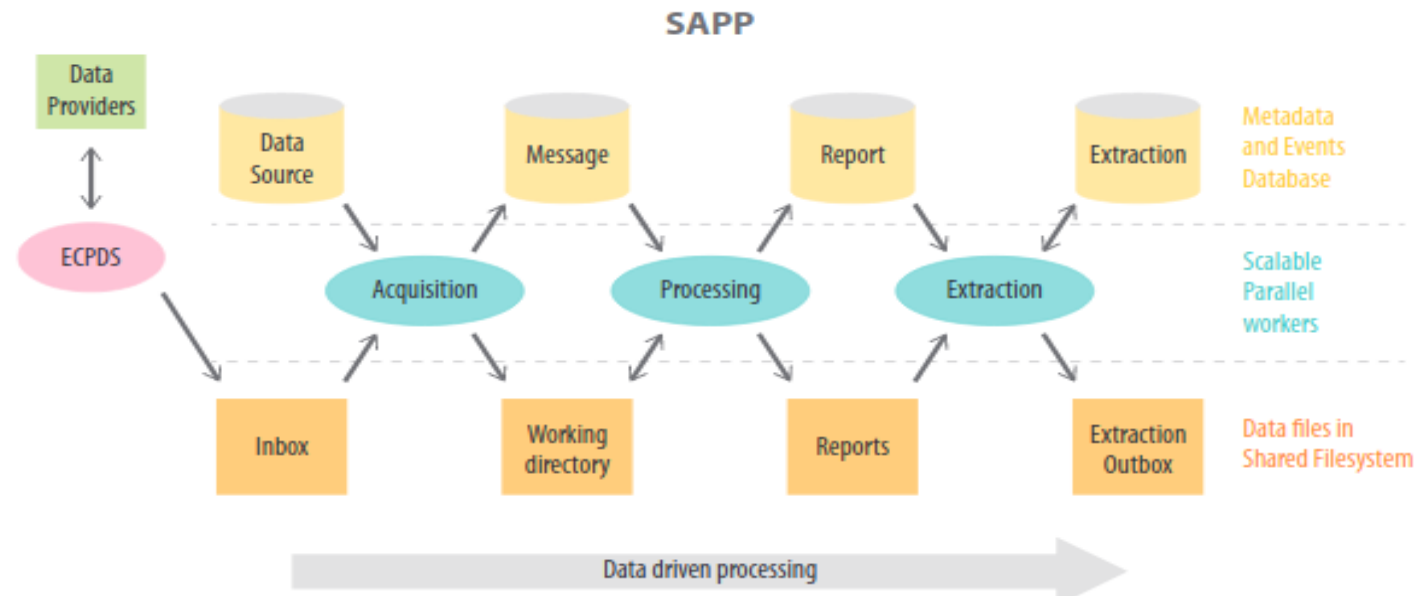


SAPP SYSTEM

- ❑ With the approval of **SAPP Optional Program** by ECMWF Council the Member and the Co-operating States that have decided to participate in the SAPP Optional Programme are provided with SAPP user support, workshops, and online documentation.
- ❑ TSMS has been using SAPP software package operationally since July 2020. The previous system for observation pre-processing at TSMS was HAPP.

WORKFLOW AND FEATURES OF SAPP

1. **Acquisition:** Newly received observation file is sent to the decoder.
2. **Processing:** The decoder is run on the messages and the messages are turned into reports
3. **Extraction:** The data from the reports generated at the previous stage are extracted.



(Source: Fucile, E. et al., 2014: SAPP: a new scalable acquisition and pre-processing system at ECMWF. ECMWF Newsletter No. 140 – Summer 2014, pp. 37–41. doi: 10.21957/3ylomoa6)



SAPP VS HAPP

□ SAPP vs HAPP

- Scalable-several processes on several nodes,
- Fault tolerant-in case of a problem a new available node is used,
- SAPP Dispatcher instead of SMS,
- Usage of Python, no more errors related to FORTRAN codes of HAPP,
- SAPP provides easier decoding without any problem and processes more observations,
- Easier monitoring by SAPP (real-time monitoring, detect errors, solve issues quickly),
- Using eccodes for routing and metadata.

INSTALLATION OF SAPP AT TSMS



- SAPP was obtained from ECMWF as a virtual machine and installed in the virtual environment of TSMS.
- The Centos Linux release 7.1 server with 4 CPUs, 8 GB of memory was transferred to TSMS via current network line between ECMWF and TSMS and it was deployed to VMware virtualization environment at TSMS.
- After the installation of SAPP some specific adjustments were done;
changing hostname,
installation of Mars Client for archiving the observations,
creating the crontab scripts and installation of the ftp service to receive the observations to be processed by SAPP.

SAPP RELATED ACTIVITIES



Observation types;

- Synoptic observations (Turkey and abroad)
- Automatic Weather Station observations (Nearly 1750 stations, Turkey)
- Radiosonde observations (Turkey and abroad)
- METAR observations (Turkey and abroad)
- Airep observations (All)
- Ship observations (Turkey and abroad)

Observation Type	Daily Total Obs. (03/03/2021)	Daily Station/Obs. Point Number (03/03/2021)
Synop	280.337	8316
Temp	3009	485
Ship	21.815	890
Metar	180.627	4979
Airep	187.278	2901
Local AWOS	34.437	1634

SAPP RELATED ACTIVITIES



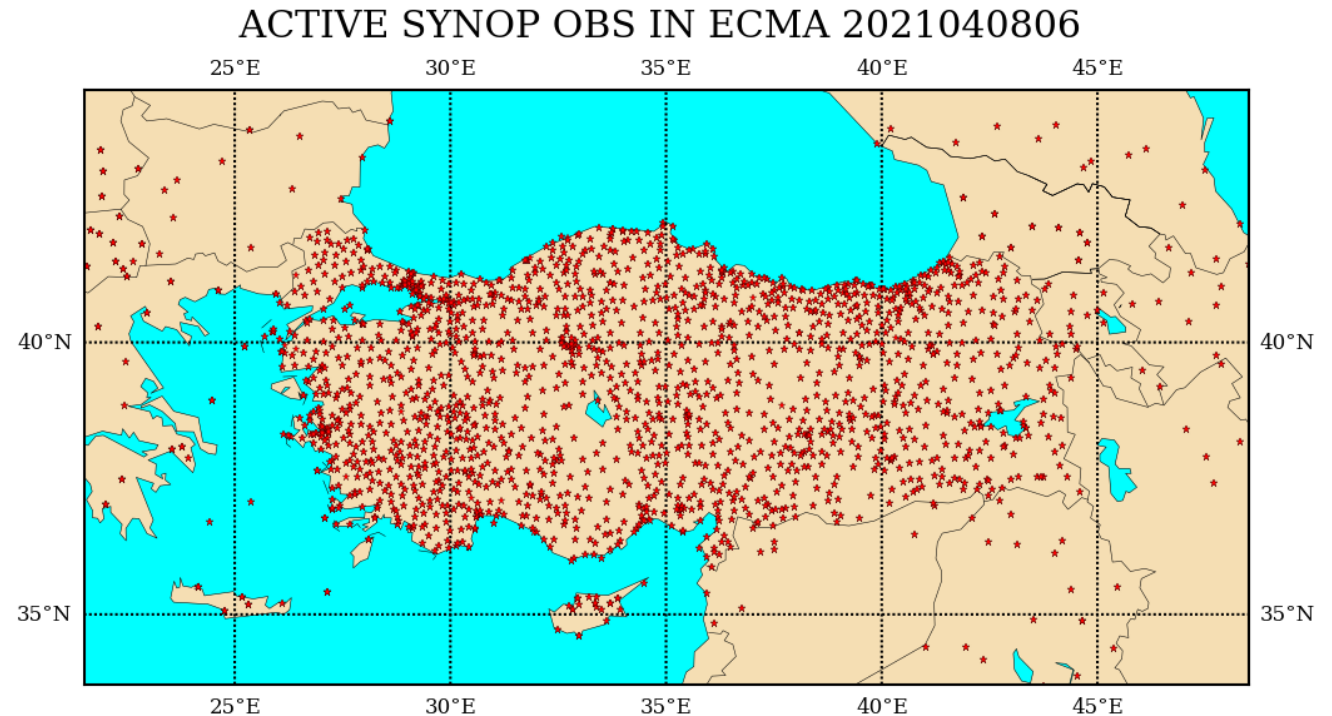
- A shell script is running every hour to send the bufr obs. to NWP servers.
- Modified ext_cmd.py python script is used (developed at ECMWF).
- DA window time details, decoders, BUFR subtypes, and more are passed to ext_cmd script expects.
- Local stations were defined in SAPP.
- ext_cmd.py and utils.py scripts support standard WMO Blocks.
- TSMS Official WMO Block id is 17, but we also use 18,19, and 20. These ids were added.
- All TSMS BUFR observations are sent to NWP.

SAPP RELATED ACTIVITIES



DAsKIT Activities-Arome-Tr Surf. DA –Pre-operational

- 72 vertical levels, 1.7 km horizontal resolution
cy43t2_bf10,
- Tstep:60 sec. coupled with ECMWF-IFS,
- 24 hr forecast every 3 hours,
- CANARI-OIMAIN Method. LMESCAN=.T.,
- SAPP synop obs (Rh2m,T2m) are assimilated.
- bator_decodbufr_mod.F90, param.cfg kindly provided by Eoin Whelan helped us decode SAPP synop obs. (Because of template 307005)
- ECMWF bufrdc library–ECMWF bufrtables are used.

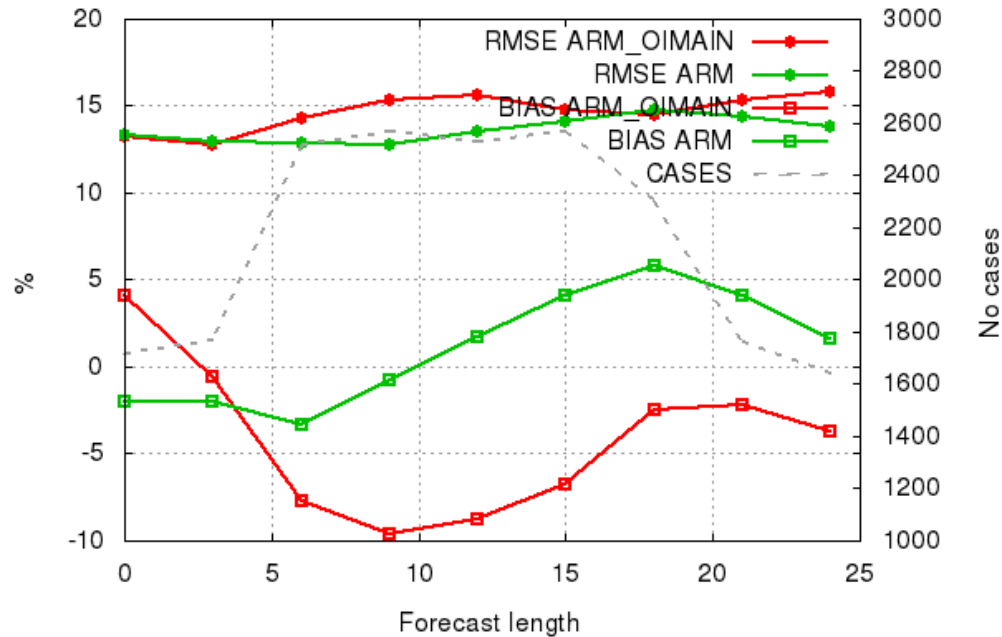


SAPP RELATED ACTIVITIES

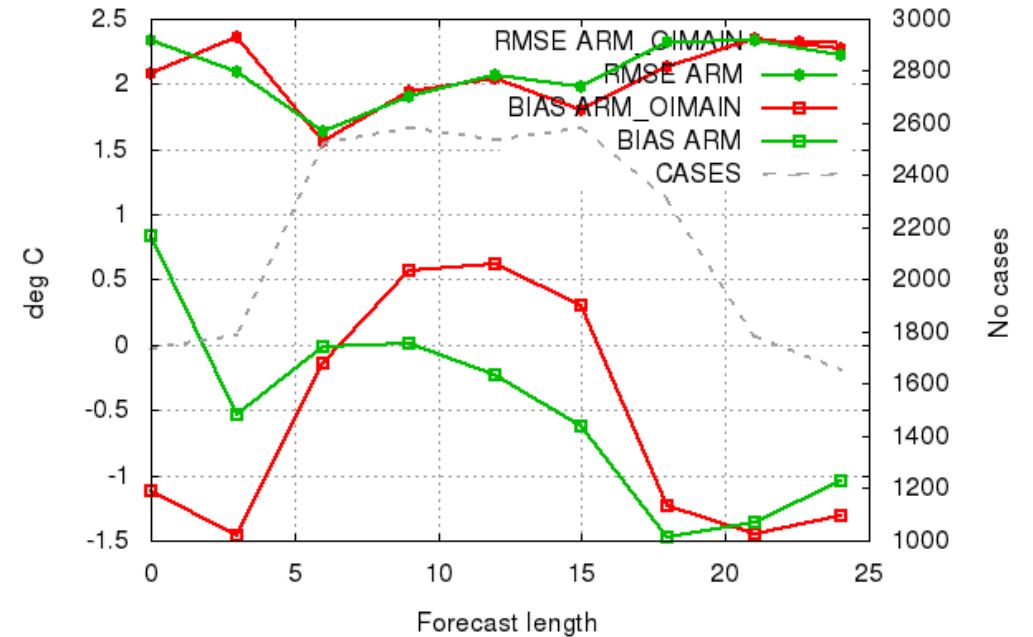


Verification Results

Selection: ALL using 118 stations
Rh2m Period: 20210310-20210331
Hours: {00}



Selection: ALL using 118 stations
T2m Period: 20210310-20210331
Hours: {00}





SAPP RELATED ACTIVITIES

•At TSMS, we prepared a wiki page for DAsKIT where we can share our work in the scope of DAsKIT.

• DAsKIT wiki is quite new. Its enrichment is ongoing by the precious effort of participants.

•This wiki is only open to ACCORD members. Login is also required. An e-mail is sent to ycengiz@mgm.gov.tr by writing name, surname, and institution in mail content and DAsKIT wiki login in the mail subject.

•In this wiki, one of the topics is pre-processing of observations which includes SAPP.

DAsKIT

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Pre-processing

Steps to Read Synop Observations Processed by SAPP at TSMS [\[edit | edit source \]](#)

The steps to read SAPP observations we receive from GTS and local sources are as follows

- Bufr library was built by using ECMWF bufr library (ECMWF BUFRDC-Version 000409).
- bator_decodbufr_mod.F90 code sent by Eoin Whelan was used. In the code, Synop_old subroutine decodes synop template 307005.
- BATOR was compiled using -DOLDBUFR flag.
- param.cfg sent by Eoin Whelan was modified regarding the 307005, 307007 and 301031 templates.
[Bator_decodbufr_mod_from_Eoin.F90](#)
[Syno.20200818.17.bufr](#)
[Param_bator.cfg.conv.sapp_from_Eoin.txt](#)
[Param.modified.txt](#)

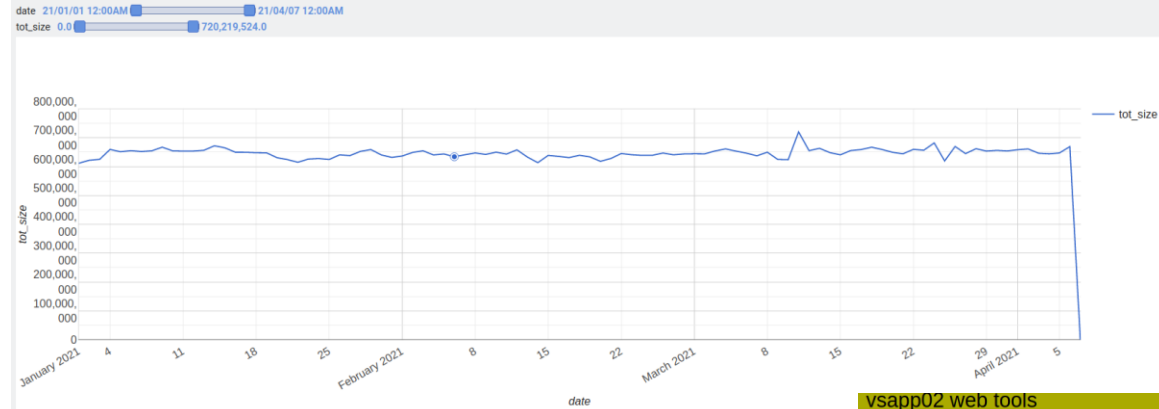
Yelis Cengiz

This page was last edited on 9 April 2021, at 11:07.

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MONITORING OF SAPP



date	datasource	count	min_ltv	avg_ltv	max_ltv	min_size	avg_size	max_size
Jan 1, 2021, 12:00:00 AM	Itaa_gts	19,952	0	4	3,592	222	30,653	2,175,227
Jan 2, 2021, 12:00:00 AM	Itaa_gts	21,427	0	4	3,586	149	29,027	2,175,227

vsapp02 web tools

Main

- [Config DB](#)
Configure vsapp02 (ie datasource, deqc, deqc, route, extraction tables)
- [Supervisor](#)
vsapp02_process_manager
vsapp02_system_monitor

Proc Monitor

- [Proc: data tracker \(acq->proc->ext\)](#)
- [Proc: data availability \(incl. GTS and Station metadata\)](#)
- [Proc: Yesterday's 24h processing data volumes](#)
- [Proc: last 2h proc stats \(details\)](#)
- [Proc: 24h processing stats](#)
- [Proc: 24h BUFR templates proc status](#)
- [Proc: jobs queue and estimated finish times](#)
- [Proc: 24h jobs processing times](#)
- [Proc: deqc history \(first/last proc\)](#)
- [Proc: RDB Subtype history \(first/last proc\)](#)

Acq Monitor

- [GTS monitor \(deqc.da\)](#)
- [Acq: 24h aca data volumes](#)
- [Acq: datasource no data check](#)
- [Acq: datasource inbox file counts](#)
- [Acq: incoming BUFR templates tracking](#)

Charts

Timeliness charts/maps

- [Arrival times for data processed 'shift' days ago between 'hh1' and 'hh2' hours \(parameters: deqc, stype, orig_id, shift, usedate\)](#)
- [Timeliness \(redate-ingdate\) for data processed 'shift' days ago between 'hh1' and 'hh2' hours \(parameters: deqc, stype, orig_id, shift, usedate\)](#)
- [Timeliness history: daily count of processed reports and min avg max delays \(parameters: deqc, stype, orig_id, datasource, from_date, to_date\)](#)

- [report_date_range \(YMDH\) vs ingdate\(parameters: deqc, stype\)](#)
- [station obs frequency history, by hour \(parameters: orig_id, deqc, stype\)](#)
- [station obs frequency history, by day \(parameters: orig_id, deqc, stype\)](#)
- [Proc: 00Z egr BSSH stations timeliness \(color coded\)](#)

Volumes/counts/subsets charts

- [Proc: vday proc volumes in KB](#)
- [Proc: vday proc subsets by datatype \(source:deqc:subtype\)](#)
- [Acq: acq stats history \(eg egr -gts\)](#)
- [Proc: Data volumes history \(eg egr BSSH\)](#)
- [Proc: Data volumes history \(eg metop A = valid 4\)](#)

Extraction counts

- [Message_Report_Extraction_daily_count_stats](#)

[TEST] Coverage maps

- [\[TEST\] last 10 mins of processed data \(tness<1h\) on map](#)
- [\[TEST\] last 10 mins of processed data \(tness<1h\) 3Q](#)
- [DEQC/STYPE rlike based coverage map \(obs first seen in last 8hr days\)](#)

Extra

Other

- [Adm: sql/chart test](#)
- [Adm: django actions changelog](#)
- [Proc: msg processing monitor \(incl. GTS\)](#)
- [Proc: on demand 06h msg processing stats](#)
- [Proc: on demand 24h report stats by deqc:subtype:redate](#)
- [WMO Station list monitoring](#)
- [TAC2BUFR monitor](#)
- [stations' lat lon changelog](#)
- [stations not found in WMO catalogue](#)



References

Fucile, E. et al., 2014: SAPP: a new scalable acquisition and pre-processing system at ECMWF. ECMWF Newsletter No. 140 – Summer 2014, pp. 37–41. doi: 10.21957/3ylomoa6



THANK YOU FOR
YOUR ATTENTION!