



SAEON Observation Database

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Background



- SAEON took over custodianship of streamflow and weather data from the CSIR
- Catchments from around South Africa with hourly streamflow and rainfall data back to 1938
- New automated loggers being deployed in many of the catchments
- Cathedral Peak rehabilitated

Background

- Over half a million streamflow data records per decade recorded for the 6 currently operational weirs
 - Streamflow – 11 947 396
 - Rainfall – 7 458 464
 - Temperature – 399 990
 - Humidity – 399 990



Necessity



- Need to centrally manage, store and maintain observation data across all SAEON nodes
- Streamflow and weather have become a key monitoring focus area for SAEON
- However, potential for expanding terrestrial monitoring, for example: soil moisture
- Two marine nodes with established monitoring programs collecting multivariate observation data

Design Requirements



- Interoperable with other internal and external systems
- Allow for extensions in terms of data acquisition and data sources
- Allow for flexible querying of the database
- Publicly accessible for data upload and query

Specifications

- Database schema based on a subset of the EnviroDB schema
- In future be capable of extending to full EnviroDB schema
- Allow simple transformation and/or mapping to SensorWeb schema



Challenges



- Multiple data sources and data types including ad hoc / citizen science
- Missing data and data quality
- Cater for historical data formats and modern automated equipment
- Rating tables, calibration curves and correction factors











User Information

- Navigation
- Data Views
- Master Data Management
- System Administration
- Roles
- Users

Roles Users

Users

Add User Change Password

User Name	Email	Date Created	Options
e	ee1@ee.ee	2012-03-10	 
JP	jp@brittondev.co.za	2012-03-08	 
test user	tuser@test.com	2012-03-12	 
victoriag	victoria@saeon.ac.za	2012-05-11	 
w	reniertest1@brittondev.co.za	2012-03-09	 

Roles

Add Role

Role Name	Description
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Monitoring Sites



Environmental Observations

Navigation: Roles, Users, Organisations, Stations

Stations

Add Station

To Excel To CSV

Code	Name	Project / Site	Url	Latitude	Longitude	Description	
ARC_SBK	ARC-AWS Jonkershoek	JHK_ARC - Jonkersh...		-33.986313	18.954607	ARC Automated Weat...	
JHK_BBK	Bosboukloof	JHK - Jonkershoek		-33.961726	18.931404	Bosboukloof	
CP_Peak2br	Cathedral Peak 2	CTP - Cathedral Peak		-28.98	29.25	Cathedral Peak 2	
FAN	Fanies Island	iSi - iSimangaliso		-28.1	32.45	The main lake of St. L...	
HNB_AWS	Haenertsburg Davis Pro2 AWS	HNB - Haenertsburg	http://www.saeon.ac.za/newslet...	23.941944	29.940556	Vantage Pro2 weathe...	
LGR	Langrivier	JHK - Jonkershoek	http://data.saeon.ac.za	-33.987652	18.969849	Langrivier catchment i...	
Map	Mapelane	iSi - iSimangaliso	http://www.isimangaliso.co.za/html...	-28.45	32.416667	Mphelane, The South...	
JHK_TKF	Tierkloof	JHK - Jonkershoek		-33.979032	18.951475	Tierkloof catchment	

Displaying 1 of 11

Data Sources



Environmental Observations

- Navigation
- Data Views
- Master Data Management
- Organisations
- Projects/Sites
- Stations
- Data Sources**
- Data Schemas
- Sensors
- Phenomenon
- Unit of Measure
- Offerings
- Import Batches

Roles Users Organisations Stations **Data Sources**

Data Sources

+ Add Data Source To Excel To CSV

Code	Name	Url	Description	Data Schema	
ACSYS_R	ACSYS_Rainfall	http://data.saeon.ac.za	Historical rainfall data - ACSYS	ACSYSrainfall	
ACSYS_S	ACSYS_streamf...	http://www.data.saeon.ac...	Data source: historical upload from A...	ACSYSstreamflow	
ARC_AWS	ARC_AWS	http://data.saeon.ac.za	Data source: Swartboskloof Automat...	ARC_AWS	
DFg	DFhDFH	http://data.saeon.ac.za	fdhDFDgr	iSimangaliso_WV...	
HNB_AWS	Haenertsburg A...	http://data.saeon.ac.za	SAEON Ndlovu Node - Haenertsburg ...	Davis_Vantage_...	
iSI_VL	iSimangaliso Wa...	http://www.isimangaliso.c...	Water level logger files obtained from...	iSimangaliso_WV...	
Test1	Test2	http://data.saeon.ac.za	Testing		
TROLL_100_VL...	TROLL 100 Wat...	http://data.saeon.ac.za	Troll 100 Water logger (Water Level a...	iSimangaliso_WV...	

Page 1 of 1 Displaying 1 - 8 of 8

Roles

+ Add Role

Role Name	Description	Date Start	Date End

Add Transformations

+ Add Transformation

Phenomenon	Transformation	Effective Date	End Date

Sensors



Environmental Observations

- Navigation <<
- Data Views +
- Master Data Management -
- Organisations
- Projects/Sites
- Stations
- Data Sources
- Data Schemas
- Sensors**
- Phenomenon
- Unit of Measure
- Offerings
- Import Batches

Data Schemas x Sensors x

Sensor Procedure

+ Add Sensor Procedure

To Excel To CSV

Code	Name ▲	Description	Source Name	Schema Name
ARC_AWS_E	AWS-ARC - Evapotranspiration	Swartboskloof Automated Weather Station - Evapotranspiration	ARC_AWS	Automated Weather Station - AF
ARC_AWS_H	AWS-ARC - Humidity	Swartboskloof Automated Weather Station - Humidity	ARC_AWS	Automated Weather Station - AF
ARC_AWS_R	AWS-ARC - Rainfall	Swartboskloof Automated Weather Station - Rainfall	ARC_AWS	Automated Weather Station - AF
ARC_AWS_T	AWS-ARC - Temperature	Swartboskloof Automated Weather Station - Temperature	ARC_AWS	Automated Weather Station - AF
ARC_AWS_VP	AWS-ARC - Vapour Pressure	Swartboskloof Automated Weather Station - Vapour Pressure	ARC_AWS	Automated Weather Station - AF
ARC_AWS_W	AWS-ARC - Wind	Swartboskloof Automated Weather Station - Wind	ARC_AWS	Automated Weather Station - AF
BBK_S	Bosboukloof Streamflow	Belfort Streamflow logger - Bosboukloof catchment at Jonkershoek	ACSYS_streamflow	Historical streamflow data
DVP_H	Davis Vantage Pro - Humidity	Davis Vantage Pro2 humidity sensor	Haenertsburg AWS	Davis Vantage Pro2 - Automatec
DVP_T	Davis Vantage Pro - Temper...	Davis Vantage Pro - Temperature sensor	Haenertsburg AWS	Davis Vantage Pro2 - Automatec
DVP_W	Davis Vantage Pro - Wind	Davis Vantage Pro2 Anemometer with 40' (12 m) anemometer cable	Haenertsburg AWS	Davis Vantage Pro2 - Automatec
LR_S	Langrivier_Stream	Belfort Streamflow logger - Langrivier catchment at Jonkershoek	ACSYS_streamflow	Historical streamflow data
LGR_Rain	Langrivier Rainfall	Langrivier Casella rain gauge	ACSYS_Rainfall	Historical rainfall data
TROLL_100_MAP	Rugged TROLL 100 Mapelane	The Rugged TROLL 100 instrument is designed for long- and short-term groundwater and surface-water monitoring....	iSimangaliso Water Level	Water level and pressure
Test1	Testing	Testing	DFHDFH	
TROLL_100_T_...	TROLL 100 - Temperature - ...	The Rugged TROLL 100 instrument is designed for long- and short-term groundwater and surface-water monitoring.	TROLL 100 Water Logger - Fannies Isl...	Water level and pressure
TROLL_100_WL...	TROLL 100 Water Level - Fa...	The Rugged TROLL 100 instrument is designed for long- and short-term groundwater and surface-water monitoring.	TROLL 100 Water Logger - Fannies Isl...	Water level and pressure

Data Query

Navigation

- Data Views
- Observations
- Data Query Display

Data

Expand All Collapse All Refresh

- Organisation
 - ARC
 - SAEON
 - Project Site
 - Haenertsburg
 - Cathedral Peak
 - Jonkershoek
 - Station
 - Tierkloof
 - Langrivier
 - Bosboukloof
 - Sensor Procedure
 - Bosboukloof Streamflow
 - Streamflow
 - Actual
 - Ezemvelo KZN Wildlife

Results

From Date: 6/12/1912 To Date: 6/12/2012 Filter To Excel To CSV

| ProjectSite | Station | SensorProcedure | Phenomenon | Offering | DataValue | Symbol | Date |
|-------------|-------------|------------------------|------------|----------|-----------|--------|---------------------|
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 33.6722 | m3 | 2000/01/01 00:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 0.0168 | mm | 2000/01/01 00:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 34.4401 | m3 | 2000/01/01 01:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 0.0171 | mm | 2000/01/01 01:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 34.9631 | m3 | 2000/01/01 02:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 0.0174 | mm | 2000/01/01 02:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 35.5802 | m3 | 2000/01/01 03:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 0.0177 | mm | 2000/01/01 03:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 35.866 | m3 | 2000/01/01 04:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 0.0179 | mm | 2000/01/01 04:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 35.9868 | m3 | 2000/01/01 05:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 0.0179 | mm | 2000/01/01 05:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 36.061 | m3 | 2000/01/01 06:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 0.0179 | mm | 2000/01/01 06:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 36.0543 | m3 | 2000/01/01 07:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 0.0179 | mm | 2000/01/01 07:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 36.0462 | m3 | 2000/01/01 08:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 0.0179 | mm | 2000/01/01 08:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 36.0011 | m3 | 2000/01/01 09:00:00 |
| Jonkershoek | Bosboukloof | Bosboukloof Streamflow | Streamflow | Actual | 0.0179 | mm | 2000/01/01 09:00:00 |

Conclusion



- User-friendly online front end
- Publicly available via the web
- Resource which can be used for ad hoc research or partner/stakeholder information
- Live version to be launched soon...