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

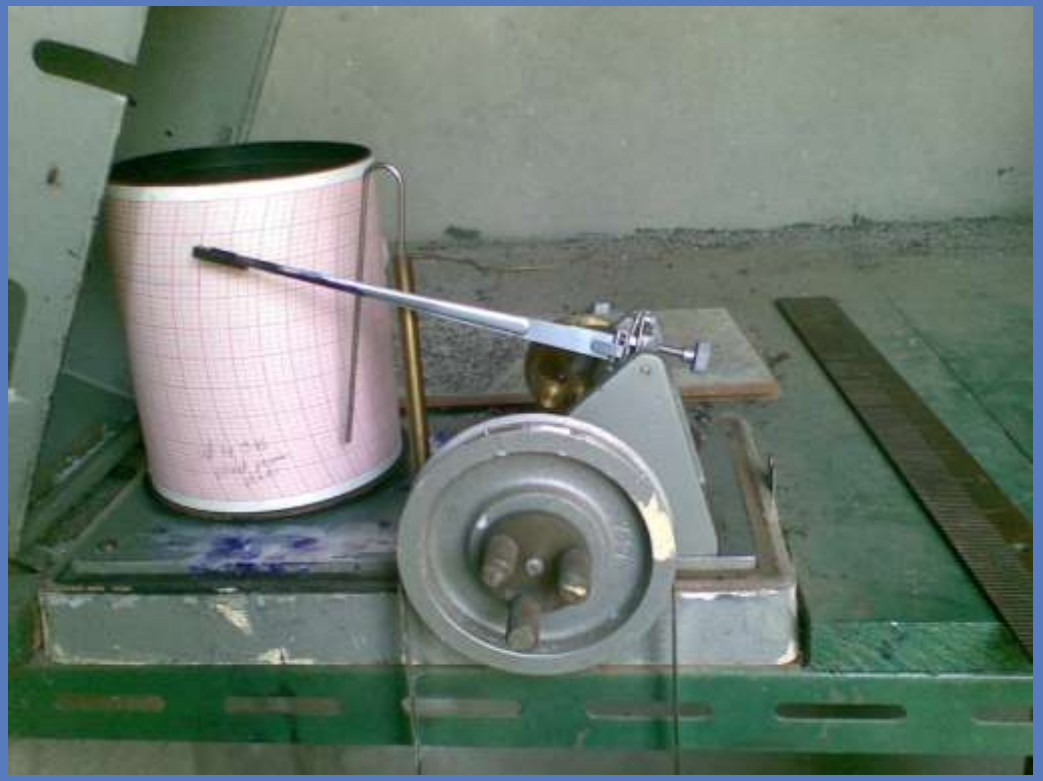
- Need to centrally manage, store and maintain observation data across all SAEON nodes
- Streamflow and weather have become a key monitoring focus area for SAEON
- However, potential for expanding terrestrial monitoring, for example: soil moisture
- Two marine nodes with established monitoring programs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

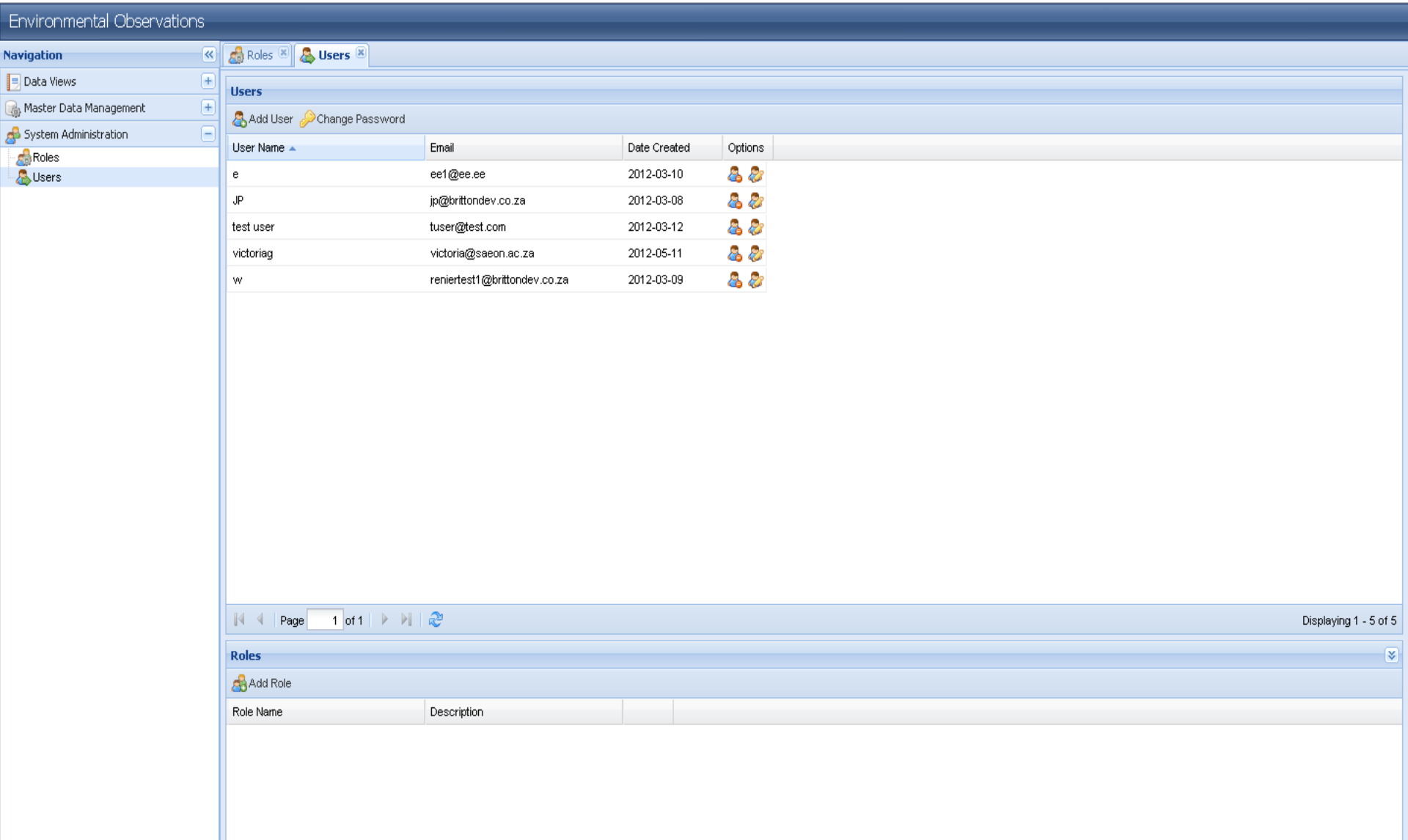
- Database schema based on a subset of the EnviroDB schema
- In future be capable of extending to full EnviroDB schema
- Allow simple transformation and/or mapping to SensorWeb schema



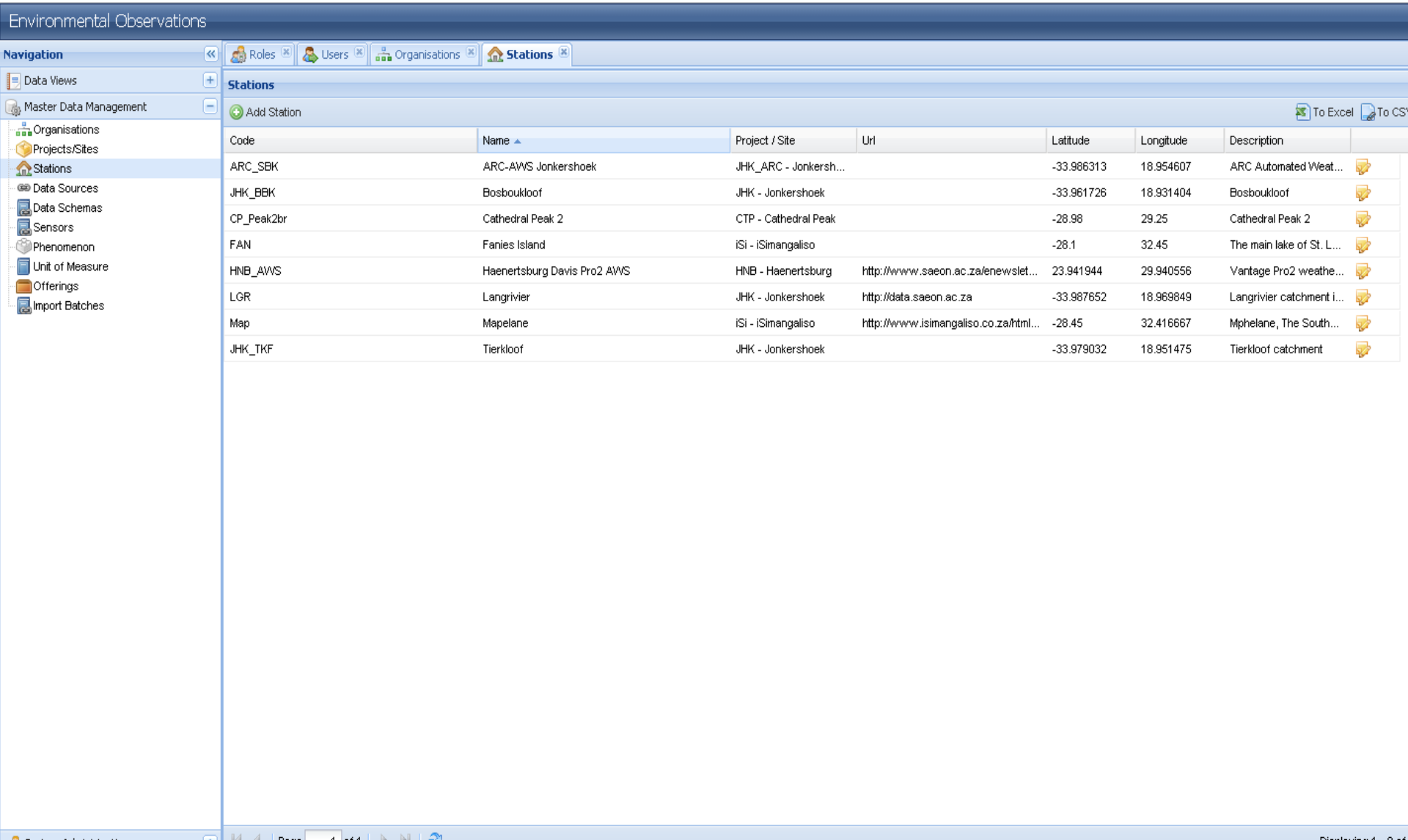
Challenges

- 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

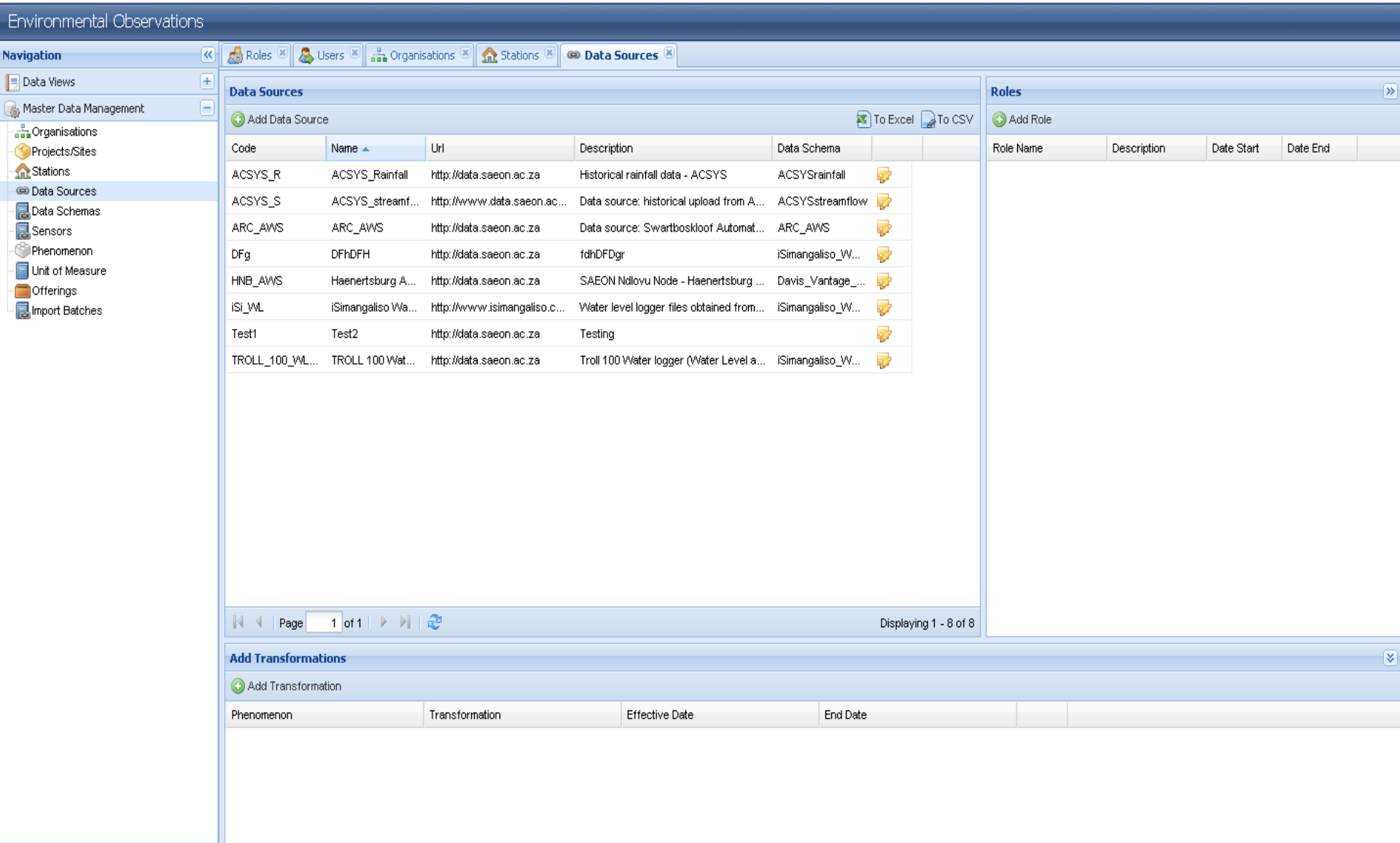


Monitoring Sites

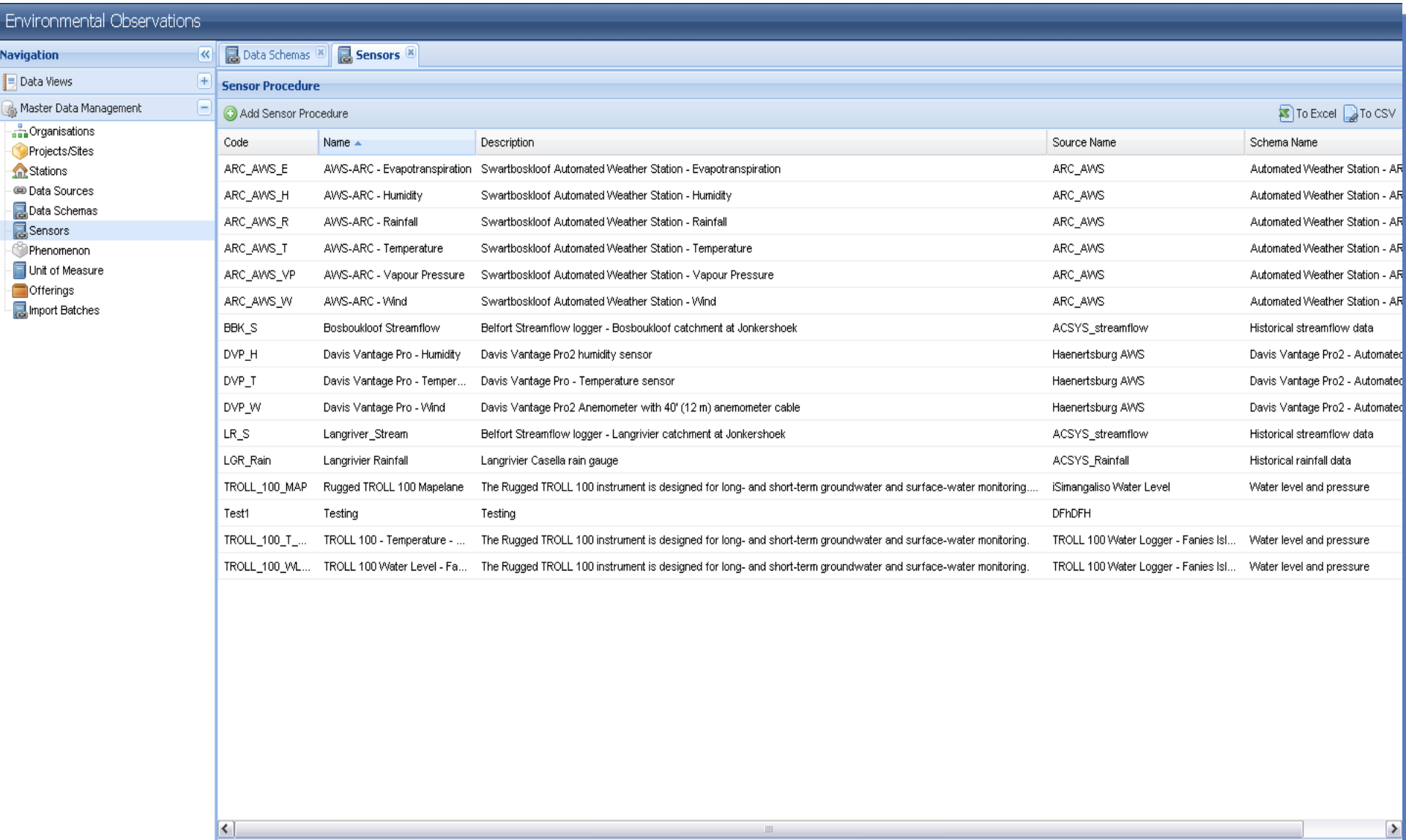


Code	Name	Project / Site	Url	Latitude	Longitude	Description
ARC_SBK	ARC-AWS Jonkershoek	JHK_ARC - Jonkersh...		-33.986313	18.954607	ARC Automated Weat...
JHK_BBK	Bosboukloof	JHK - Jonkershoek		-33.961726	18.931404	Bosboukloof
CP_Peak2br	Cathedral Peak 2	CTP - Cathedral Peak		-28.98	29.25	Cathedral Peak 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/enewslet...	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

Data Sources

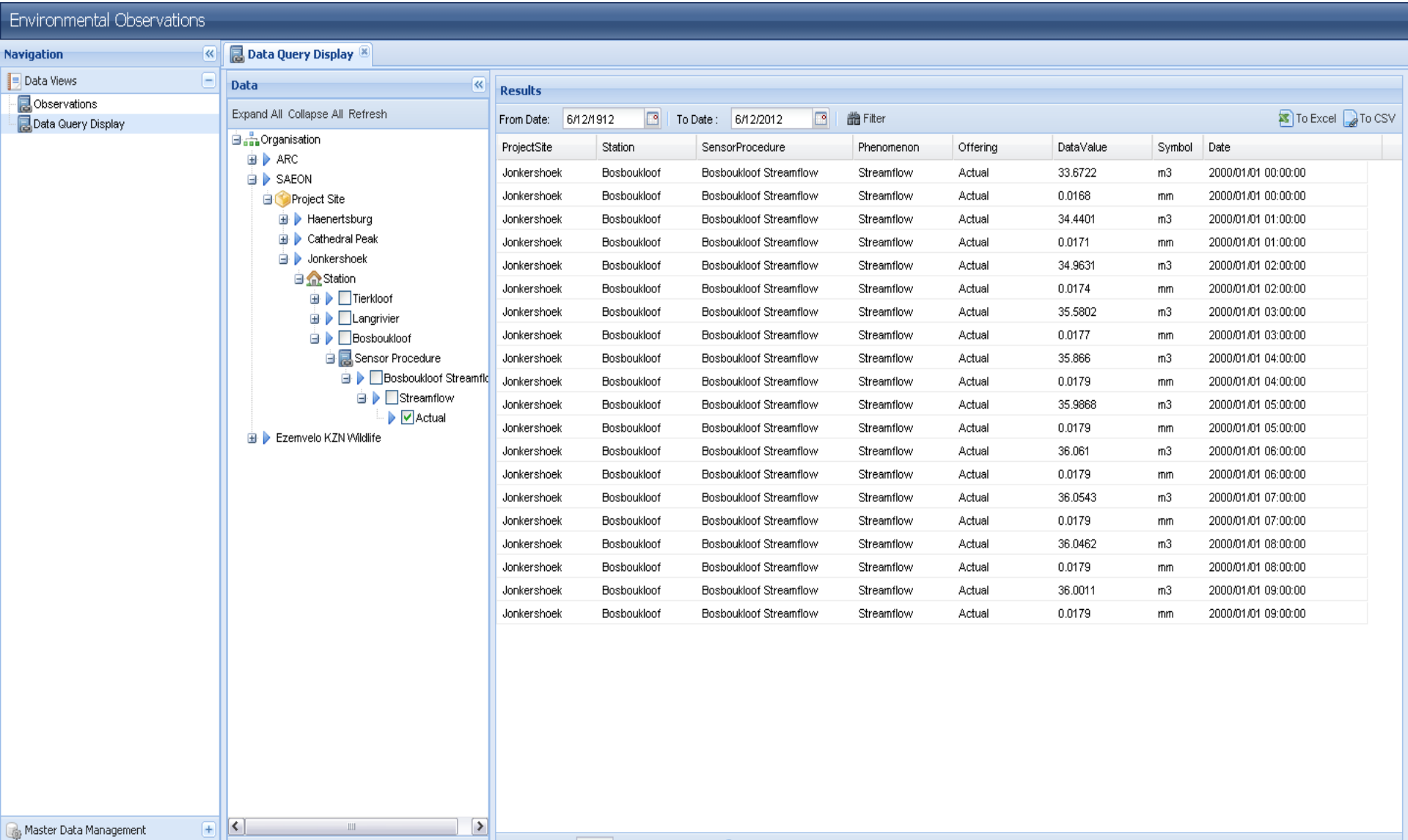


Sensors



Code	Name	Description	Source Name	Schema Name
ARC_AWS_E	AWS-ARC - Evapotranspiration	Swartboskloof Automated Weather Station - Evapotranspiration	ARC_AWS	Automated Weather Station - AR
ARC_AWS_H	AWS-ARC - Humidity	Swartboskloof Automated Weather Station - Humidity	ARC_AWS	Automated Weather Station - AR
ARC_AWS_R	AWS-ARC - Rainfall	Swartboskloof Automated Weather Station - Rainfall	ARC_AWS	Automated Weather Station - AR
ARC_AWS_T	AWS-ARC - Temperature	Swartboskloof Automated Weather Station - Temperature	ARC_AWS	Automated Weather Station - AR
ARC_AWS_VP	AWS-ARC - Vapour Pressure	Swartboskloof Automated Weather Station - Vapour Pressure	ARC_AWS	Automated Weather Station - AR
ARC_AWS_W	AWS-ARC - Wind	Swartboskloof Automated Weather Station - Wind	ARC_AWS	Automated Weather Station - AR
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 - Automated
DVP_T	Davis Vantage Pro - Temper...	Davis Vantage Pro - Temperature sensor	Haenertsburg AWS	Davis Vantage Pro2 - Automated
DVP_W	Davis Vantage Pro - Wind	Davis Vantage Pro2 Anemometer with 40' (12 m) anemometer cable	Haenertsburg AWS	Davis Vantage Pro2 - Automated
LR_S	Langriver_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 - Fanies 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 - Fanies Isl...	Water level and pressure

Data Query



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…