

LCZO Data

- 1) Existing Systems**
- 2) Data streams and sampling**
- 3) New LCZO Data site**
- 4) Other Uses and Suggestions**

Existing Live Data Site

<https://www.sas.upenn.edu/lczodata/>

- 1) Allows for the specification of meta-data and the generation of .hdr files
- 2) Drupal based
 - 1) Has disadvantage of difficult to parse database structure.
- 3) Datasets on criticalzone.org linked here.
- 4) Data stored as .csv files.
- 5) We have a web GIS application at:
 - 1) <http://gis.lczodata.com/mappingApp/index.html>

Intensively monitored Hillslope.

Continuous measurements of soil greenhouse gases via 9 automatic chamber for continuous measurement of soil CO_2 , CH_4 , and NO_2 fluxes



30 soil O_2 sensors, 30 Soil moisture and Temperature sensors on

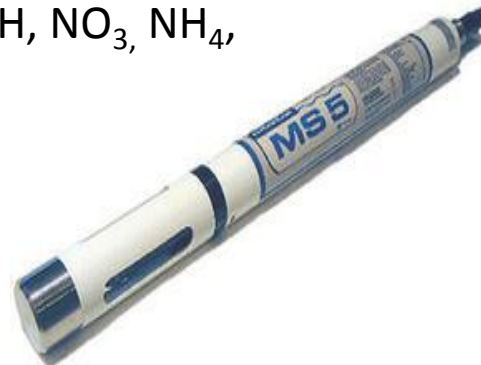


Ground and Stream Water Site Chemistry

Several Stream and groundwater sites with conductivity, dissolved oxygen(DO) loggers, and water level



Groundwater with Hydrolab MS5 multi-parameter Sondes Conductivity, Dissolved Oxygen loggers, and Water level, ORP, pH, NO_3 , NH_4 ,



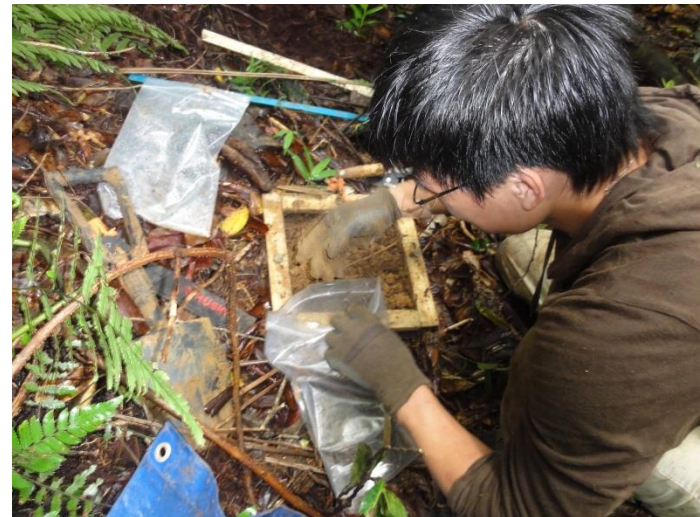
New Stream Monitoring Site with:

- YSI Sonde EXO2 multiprobe
 - fDOM ,Turbidity, pH, Total Algae, Optical DO, Conductivity/Temp Sensors
- Satlantic SUNA Nitrate Sensor



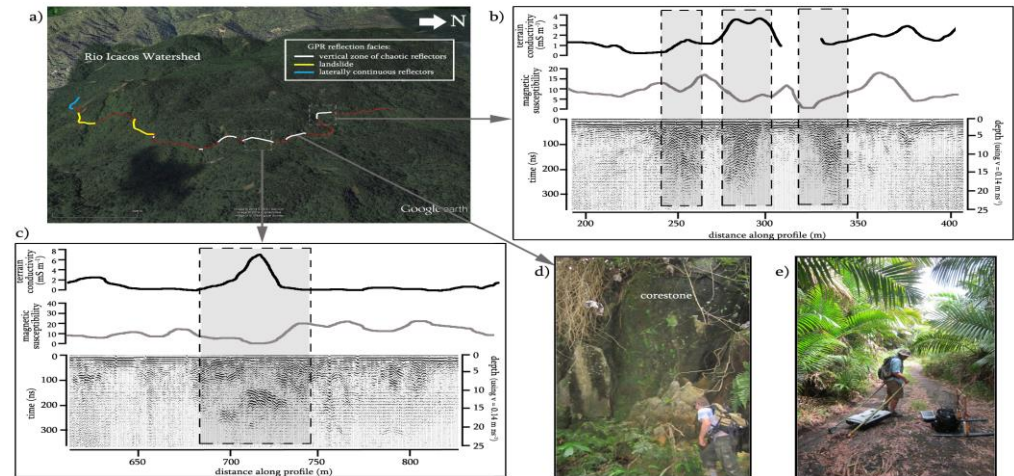
Soils Data Include:

- 216 profiles representing 24 sites in the El Yunque National Forest to determine amounts C, N, Ca, Mg, K
- 149 samples at 15 sites for soil carbon, texture and many attributes for Fe, Al (now in ODM2)

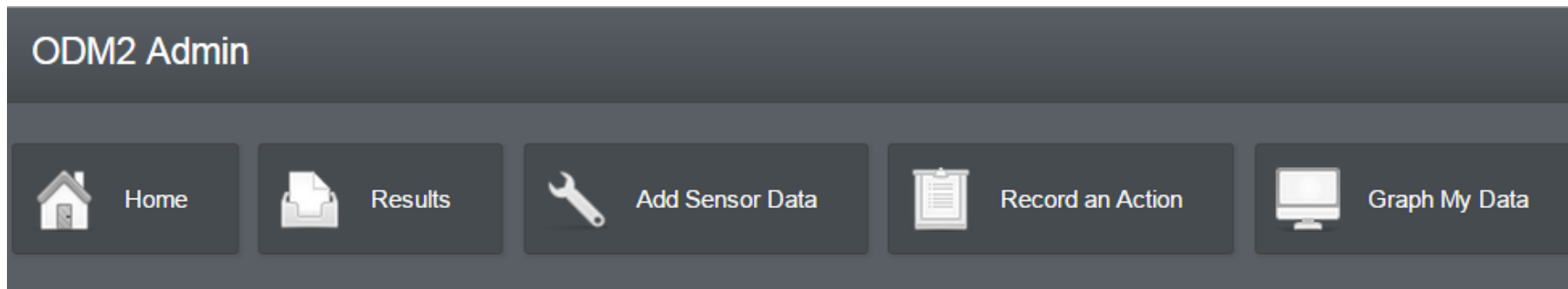


Other Data Streams Include:

- 4 weather stations managed by USFS and UPR
- 10 Gaged Streams (USGS, USFS and LCZO)
- Ceilometer
- Cloud Forest measurements for African dust inputs, cloud water precipitation, and visibility
- Stream chemistry sampling for 10 sites, since 1983.
- Geophysical Surveys – Ground Penetrating Radar (GPR), terrain conductivity and electrical resistivity imaging (ERI)



'ODM2 Admin' New Data Management Application for the LCZO



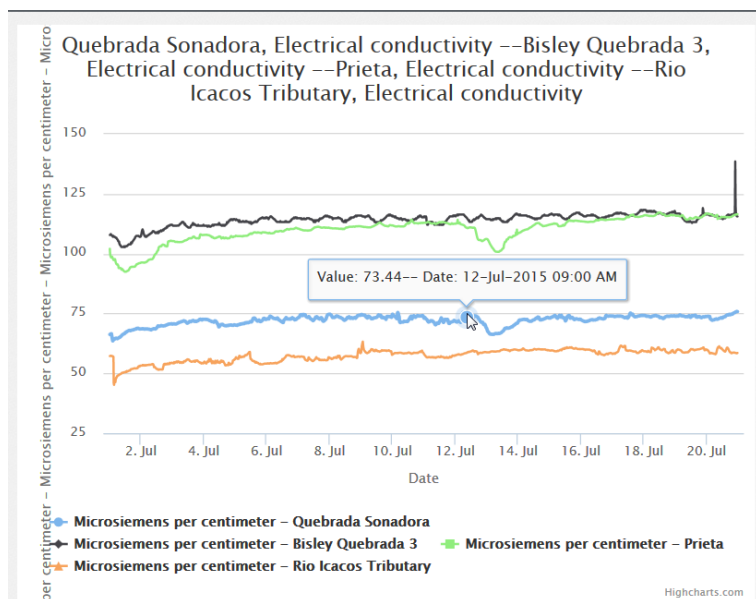
<https://github.com/miguelcleon/odm2djangoadmin>

New Data Management Application

- The site is online at
<http://lczodata.com/ODM2/>
- ODM2 in Postgresql

Tech and Data So Far

- Based on Django web platform
 - Python, POSTGIS, Highcharts,
- Data in ODM2 include 176 variables collected by 30 sensors with 1.6 million+ data values.
- 408 soil profile results
- water chemistry derived products



Select all 1664977 measurement result values

Sampling feature
geo type:

point- Point,

feature geometry
(to add a point
format is
POINT(long, lat)

POINT(0 0)

Derived Products

- water chemistry derived products from Loadflex
- Use data management to gain new scientific insights
- Tools for flux and concentration estimation
 - Interpolation
 - Regression
 - Composite method (Alunbach & Hooper 2006)
- Loadflex is also on github.com
<https://github.com/McDowellLab/loadflex>

Advantages of ODM2 Admin

- Record important events such as instrument maintenance, calibrations, sampling, sub-sampling, multi-step lab procedures, and many others.
- Works on Smartphones and Tablets.

lczodata.com

Welcome, **Miguel**. Change password / Log out

Home > Odm2testapp > Measurement result values

Select measurement result value to change

Import Add measurement result value

Search

Action: -----

Format -----

Go 0 of 100 selected

<input type="checkbox"/>	Data value	Value date time	Result
<input type="checkbox"/>	311.10585	Jan. 1, 2011, midnight	Chloride (Cl) - Cor
<input type="checkbox"/>	270.59027	Jan. 1, 2010, midnight	Chloride (Cl) - Cor
<input type="checkbox"/>	170.92866	Jan. 1, 2009, midnight	Chloride (Cl) - Cor
<input type="checkbox"/>	124.17817	Jan. 1, 2008, midnight	Chloride (Cl) - Cor
<input type="checkbox"/>	115.36273	Jan. 1, 2007, midnight	Chloride (Cl) - Cor
<input type="checkbox"/>	190.46155	Jan. 1, 2006, midnight	Chloride (Cl) - Cor
<input type="checkbox"/>	151.89889	Jan. 1, 2005, midnight	Chloride (Cl) - Cor
<input type="checkbox"/>	275.19855	Jan. 1, 2004, midnight	Chloride (Cl) - Cor

Importing and exporting data

Change data logger file

Programid: RIO- Version ▾ +

Dataloggerfilename: I30-Hydrolab-3-7-14to8-6-15

Dataloggerfiledescription: I30-Hydrolab-3-7-14to8-6-15

Dataloggerfilelink: Currently: [dataloggerfiles/I30_Master_QDbEH1c](#)
Change: No file chosen

Delete

Data Logger Columns associated with this file

[I30-Hydrolab-3-7-14to8-6-15- DateTime, -, - pH- 16- 11- I-30 well with Hydrolab- site- Site, - I-30 we](#)

[I30-Hydrolab-3-7-14to8-6-15- Temp, -, - Water Temperature- 16- 11- I-30 well with Hydrolab- site- S](#)

[I30-Hydrolab-3-7-14to8-6-15- pH, -, - pH- 16- 11- I-30 well with Hydrolab- site- Site, - I-30 well with I](#)

Change process data logger file

Select a data logger file and click [/](#) to view data logger file columns

Data logger file: I03 Hydrolab3-7-14to8-6-15 ▾ [/](#) +

CAUTION dataloggerfilecolumns must be setup, the date and tim

Processing code: 0

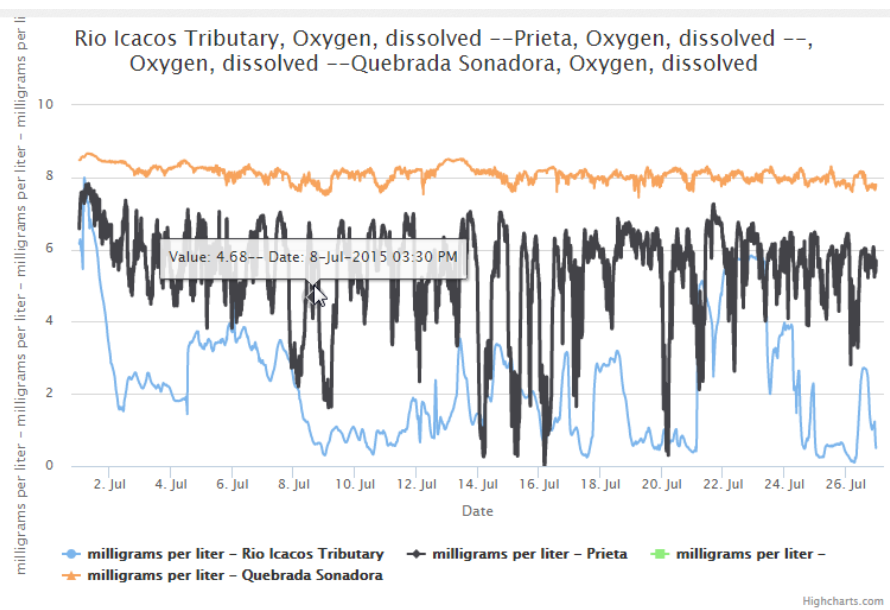
Data begins on this row number: 2

Column headers matching column labels from data logger columns on row:

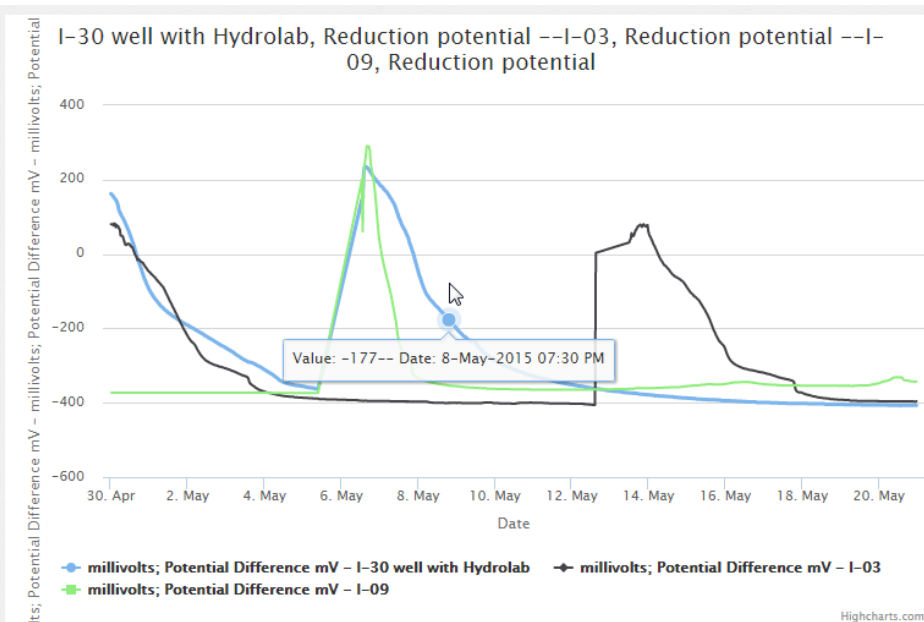
Data in ODM2

DO

ORP



- HOBO Conductivity, DO, Water level loggers



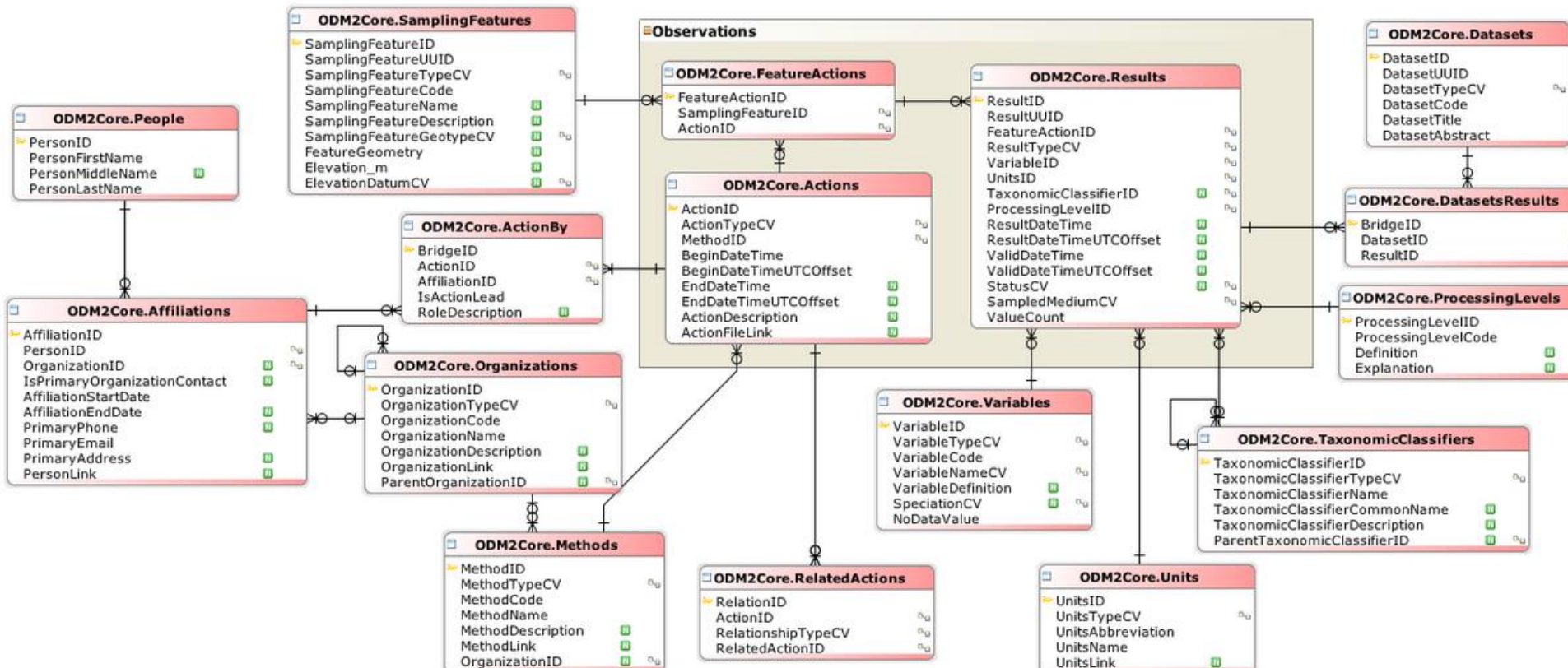
- Groundwater Hach MS5 HydroLab

Stream chemistry derived products.

Soils: Carbon, Texture, Fe, Al, and Soil moisture sensors.

Data Coming Soon to ODM2 Admin

- Instrumented hillslope data
- Stream chemistry data from sampling
- Near real-time data stream from water chemistry sensors
- More soils data
- More derived stream chemistry data from Loadflex.

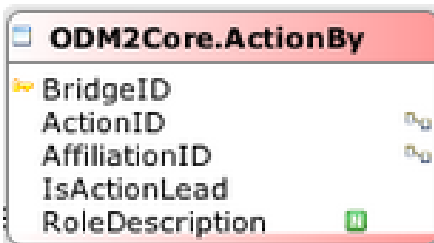


- Object relational mapping for ODM2 Core – 16 entities and 14 additional entities

Example of a Django Model

- **class** **Actionby**(models.Model):
 bridgeid = AutoField(primary_key=True)
 actionid = ForeignKey('Actions')
 affiliationid = ForeignKey('Affiliations',
verbose_name="person by affiliation")
 isactionlead = BooleanField()
 roledescription = CharField(max_length=500)
 class **Meta**:
 managed = False
 db_table = 'actionby'
 verbose_name='action by'
 verbose_name_plural='action by'

SQL Table

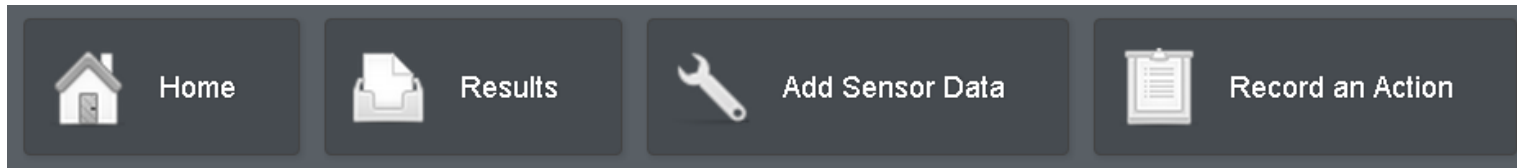


ODM2Core.ActionBy	
BridgeID	
ActionID	
AffiliationID	
IsActionLead	
RoleDescription	

Python manage.py inspectdb > models.py
Automatically generates models from a database.

Tools

- Plot data
 - Plots are completely dynamic, after adding a new data series it can be immediately plotted.
- Django Packages Are easy to use.



- Planning to rely on ODM2 tools for generation of YODA files.

Others using ODM2 Admin

- ODM2 Admin is Redeployable and can be leveraged by other projects
 - Instance deployed for TRACE
 - Interest in adding ODM2 Admin to the Big CZ Toolbox



TRACE – Tropical Response to Altered Climate Experiment

- 4 °C warming; on a 16 m² plot
- 18 soil O₂, temp, and moisture probes
- GhG with automated sampling chambers
- First Field warming experiment in the Tropics.

Just scratching the surface

- ODM2 132 entities, ODM2 Admin currently using 30 of these.
- Site is functional but still in development
 - Requires a login
- Planned features:
 - Additional QA processing
 - Additional GIS features
 - Design additional work flows such as 'Add Sensor Data' and 'Record an Action'
 - Public facing view of data

Suggestions for ODM2

- A relatedMethods table, this would allow methods to have hierarchy and multiple steps.
- ProfileResults should have an intended aggregation interval and intended aggregation units like profileResultsValues table.