

OSCAR Final Workshop

Front-end and Back-end Software

Tito Scalo, 20th January 2016

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Introduction



The OSCAR application software is capable of :

- **Monitoring** all the different devices making up OSCAR project.
- **Storing** the data in an appropriate database.
- **Processing** the devices input variables.
- **Graphic display** the devices input variables.

+ **Low-Cost Prototype project requirements**



Solution stack : Free and Open Source Software (FOSS)

FOSS technologies



- C++
- Java



Multitasking + Multithreading system on a Linux Platform

- QT + QWT



Graphical User Interface (GUI) & Data Display - Graphic Engine

- SQL



Data Management : definition, manipulation and control

- Linux
- APACHE
- MySQL
- PHP



LAMP : Web development platform

- JQuery



Web-side real-time data update

- HTML5
- CSS3



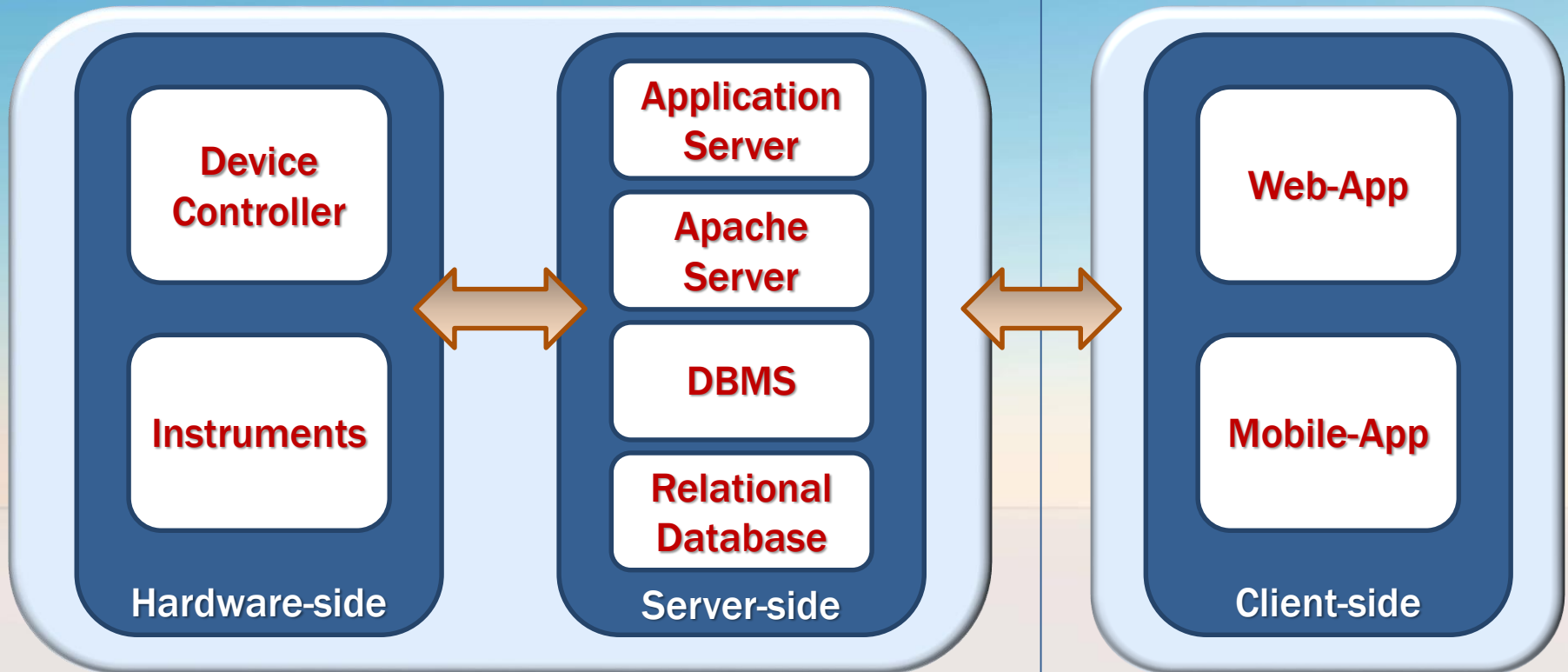
Web Interface

Architecture



Back-End

Front-End



Back-End (I)



Instrumentation

Rain Gauge



T/RH sensor



Pressure sensor



Pyranometer



Gps Antenna



Controller



Arduino Mega 2560 board

Application Server



Arduino Daemon

GPS Daemon

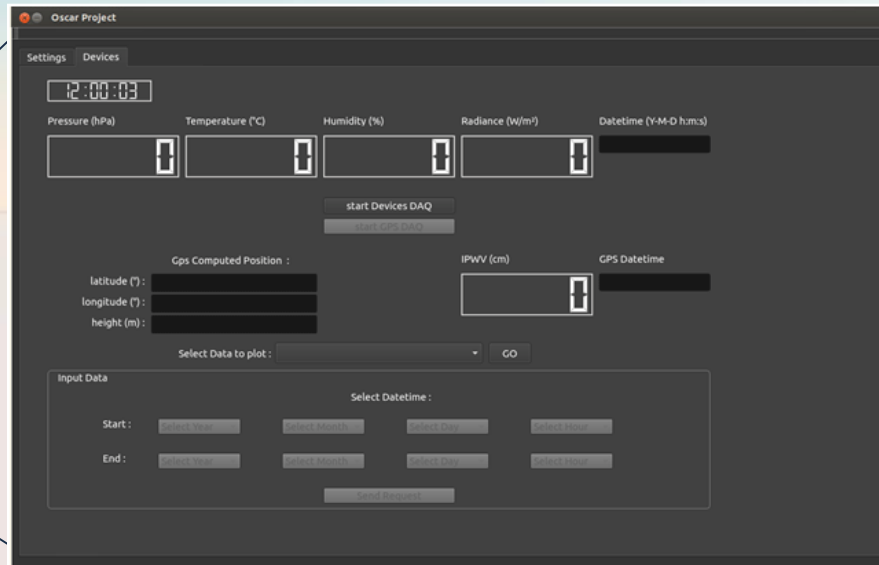
Back-End (II)



**Application Server
+
APACHE Server**

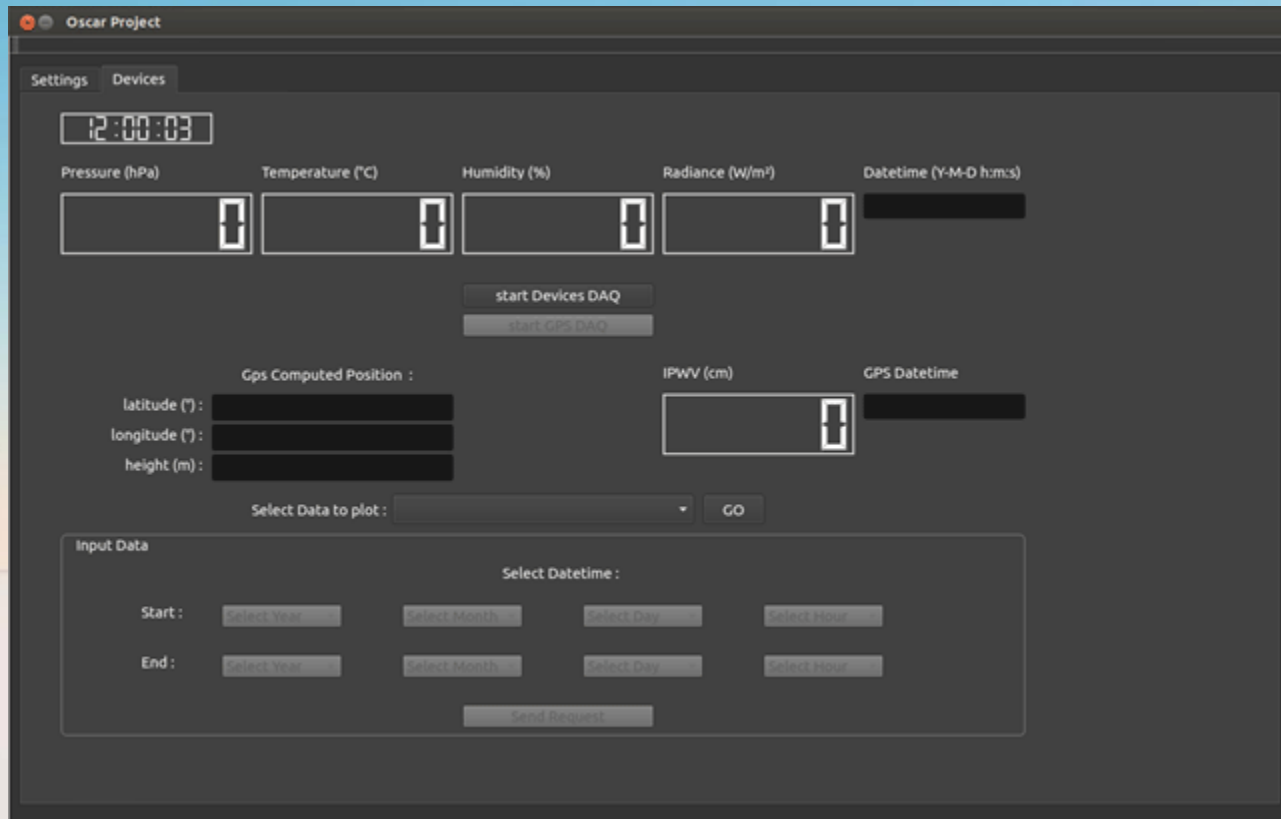


**Graphical
User
Interface**



Back-End (III)

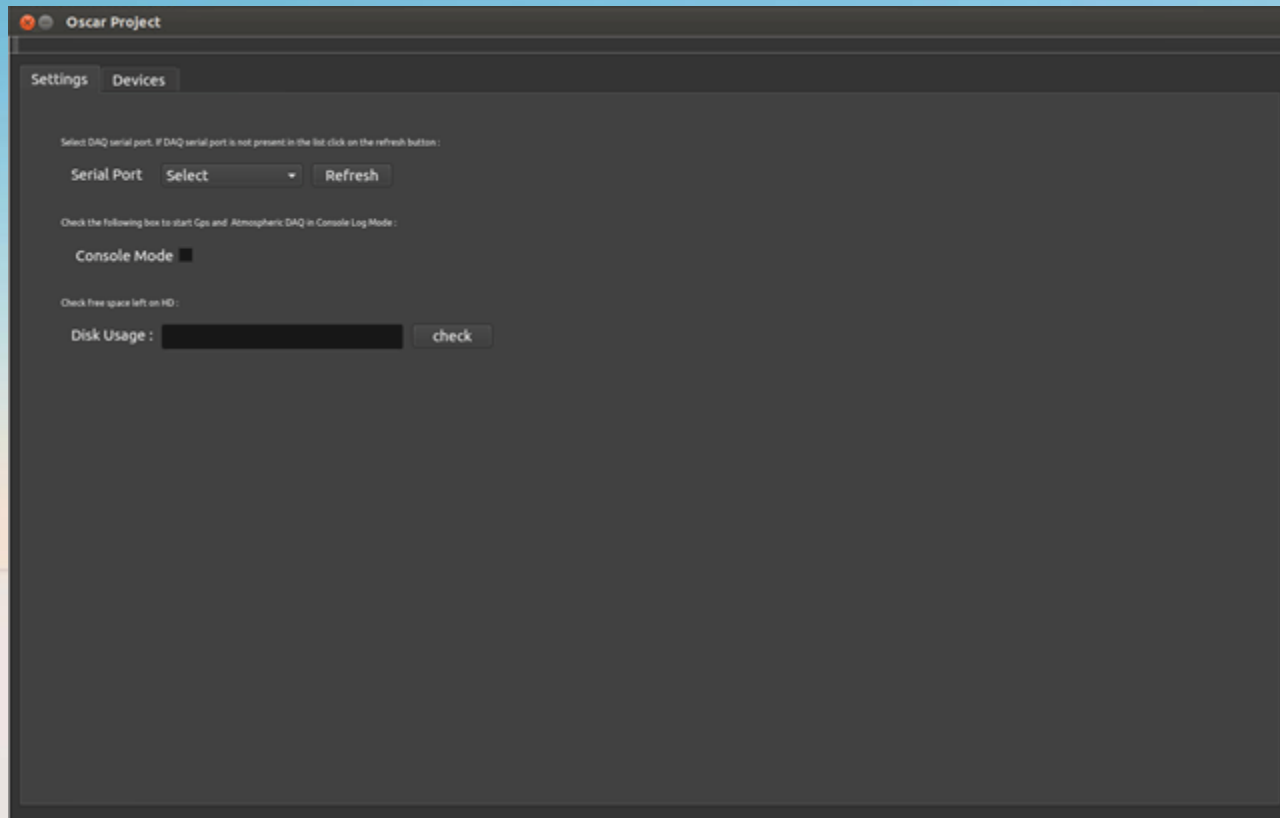
Graphical User Interface



Back-End (III)

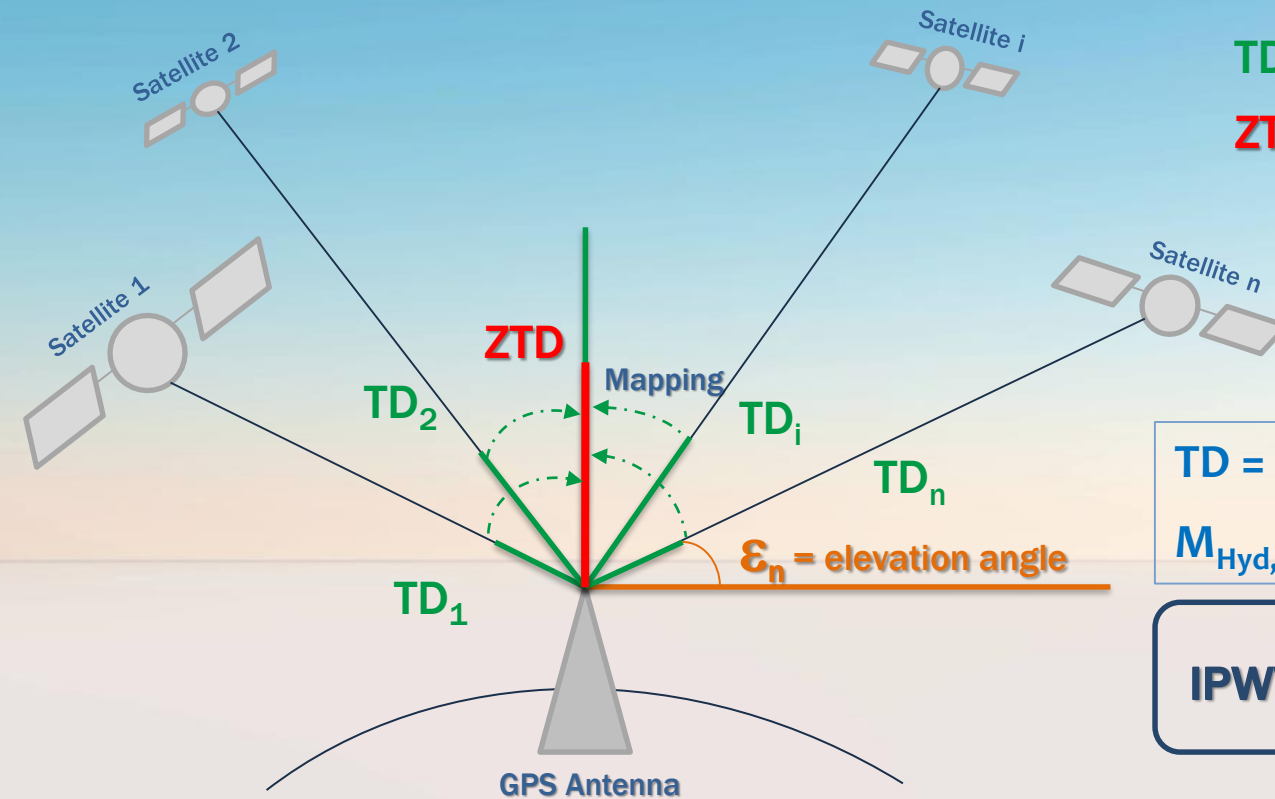


Graphical User Interface



Back-End (IV)

Integrated Precipitable Water Vapour (IPWV) computing



TD = Slant Tropospheric Delay

ZTD = Zenith Total Delay

$$TD = M_{Hyd}(\epsilon) \cdot ZHD + M_{Wet}(\epsilon) \cdot ZWD$$

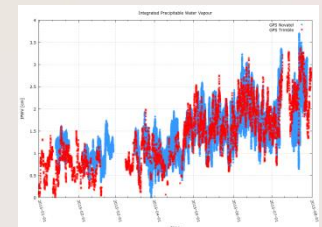
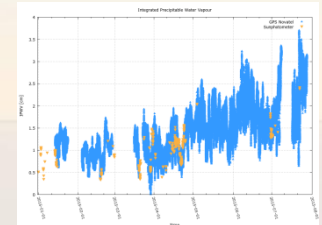
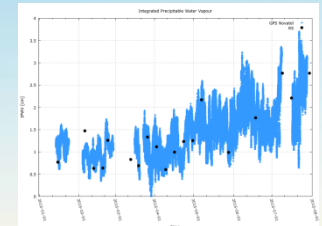
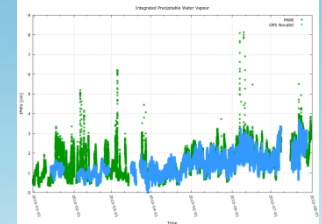
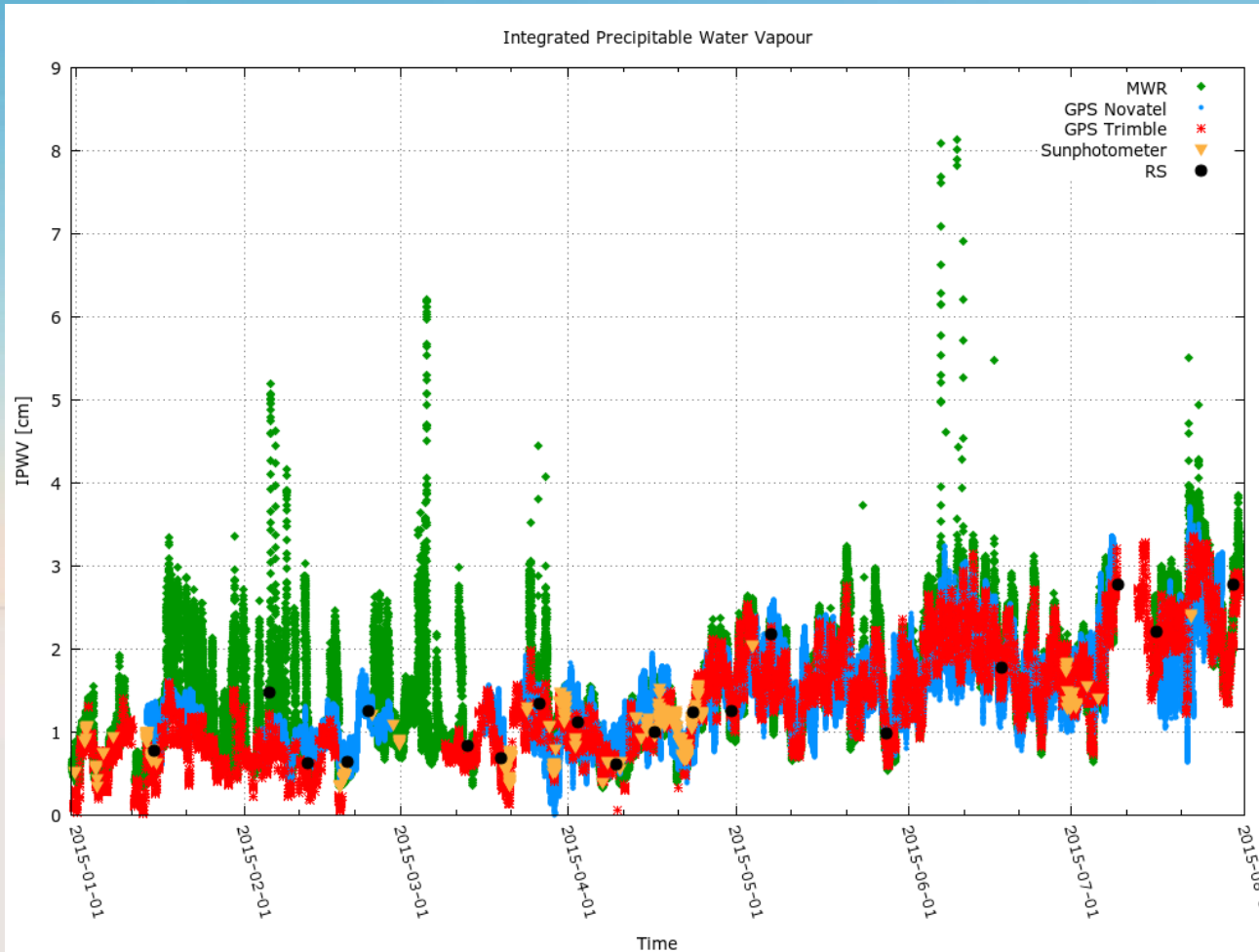
$M_{Hyd,Wet}(\epsilon) =$ Mapping Functions

$$IPWV = \Pi \cdot ZWD \longrightarrow IPWV Daemon$$

Back-End (IV)



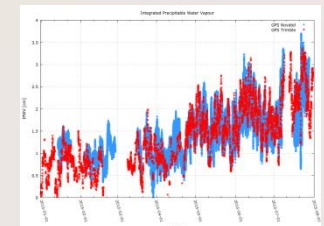
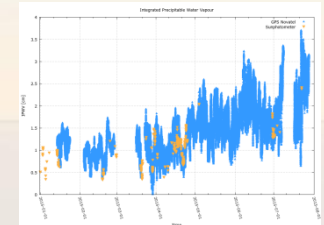
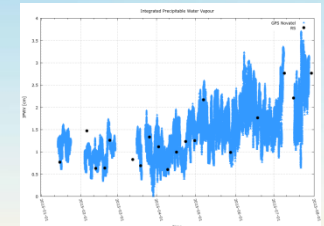
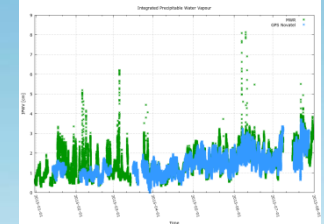
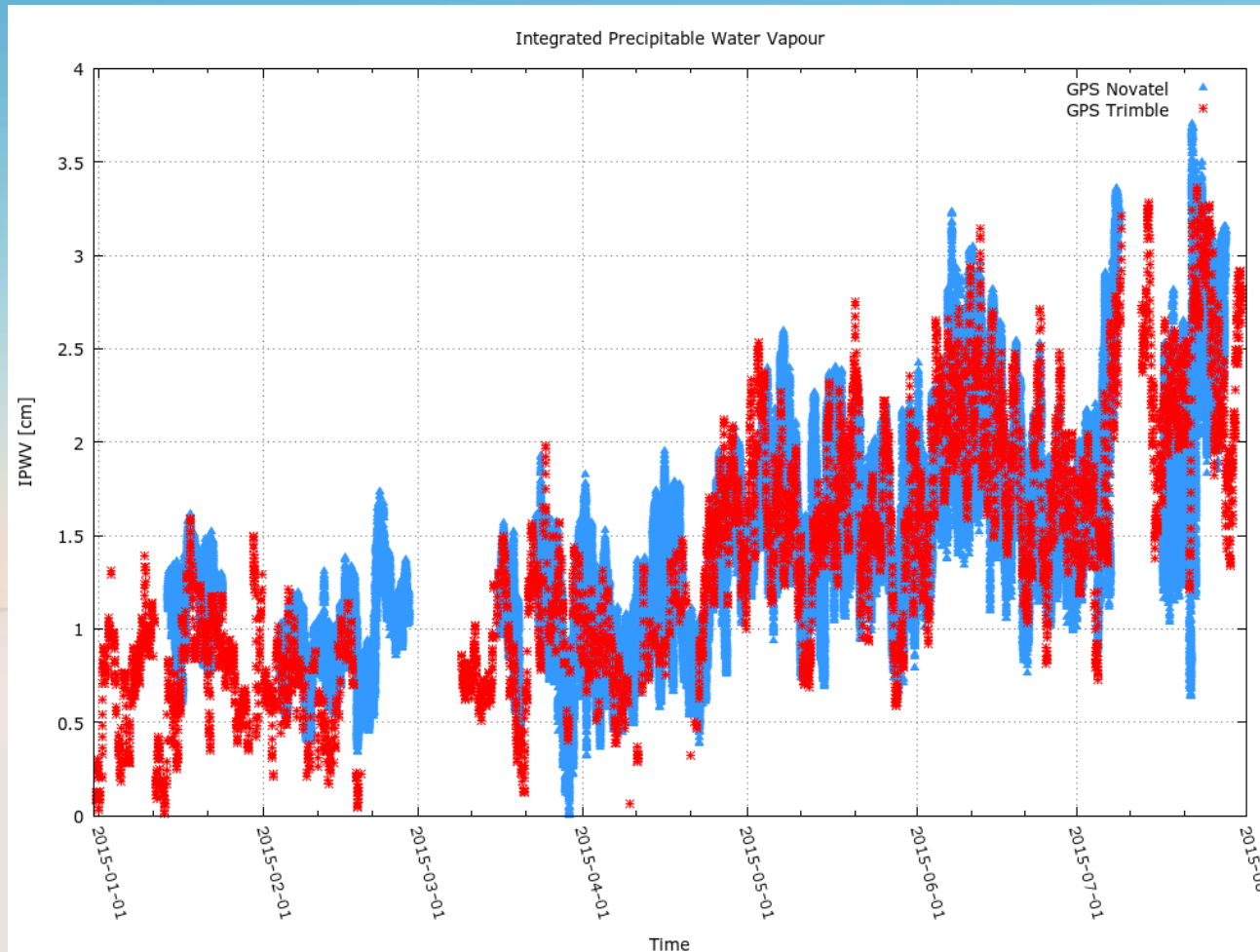
IPWV Intercomparison



Back-End (IV)



IPWV Intercomparison



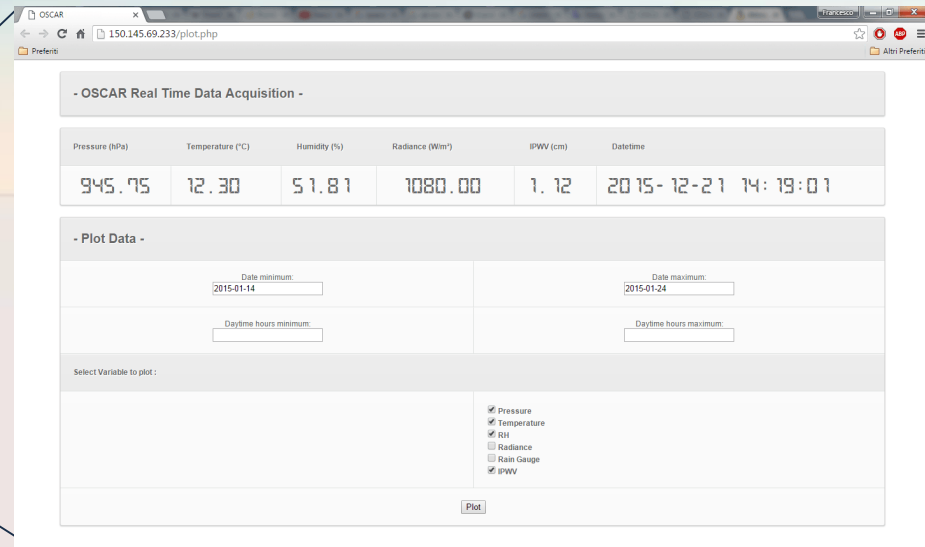
Front-End (I)



**Application Server
+
APACHE Server**



**Web
Interface**



Front-End (II)



Web Interface

The screenshot shows a web browser window with the URL 150.145.69.233/plot.php. The page content is as follows:

- OSCAR Real Time Data Acquisition -

Pressure (hPa)	Temperature (°C)	Humidity (%)	Radiance (W/m ²)	IPWW (cm)	Datetime
945.75	12.30	51.81	1080.00	1.12	2015-12-21 14:19:01

- Plot Data -

Date minimum: Date maximum:

Daytime hours minimum: Daytime hours maximum:

Select Variable to plot :

- Pressure
- Temperature
- RH
- Radiance
- Rain Gauge
- IPWW

Front-End (II)



Web Interface

- OSCAR Real Time Data Acquisition -

Pressure (hPa)	Temperature (°C)	Humidity (%)	Radiance (W/m ²)	IPWW (cm)	Datetime
945.75	12.30	51.81	1080.00	1.12	2015-12-21 14:19:01

- Plot Data -

Date minimum: 2015-01-14

Date maximum: 2015-01-24

Daytime hours maximum:

Select Variable to plot:

- Pressure
- Temperature
- RH
- Radiance
- Rain Gauge
- IPWW

Plot

Front-End (II)



Web Interface



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Thank you for your kind attention.

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