

Tide monitoring in Santa Catarina, Brazil

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Researcher

Tide monitoring program in Santa Catarina, Brazil

Oceanographic and meteorological conditions being monitored at Santa Catarina's coastline to support port operations, fisheries, aquaculture and tourism, as well as the population in general

But, where is Santa
Catarina?

Brazilian second
Southernmost state:

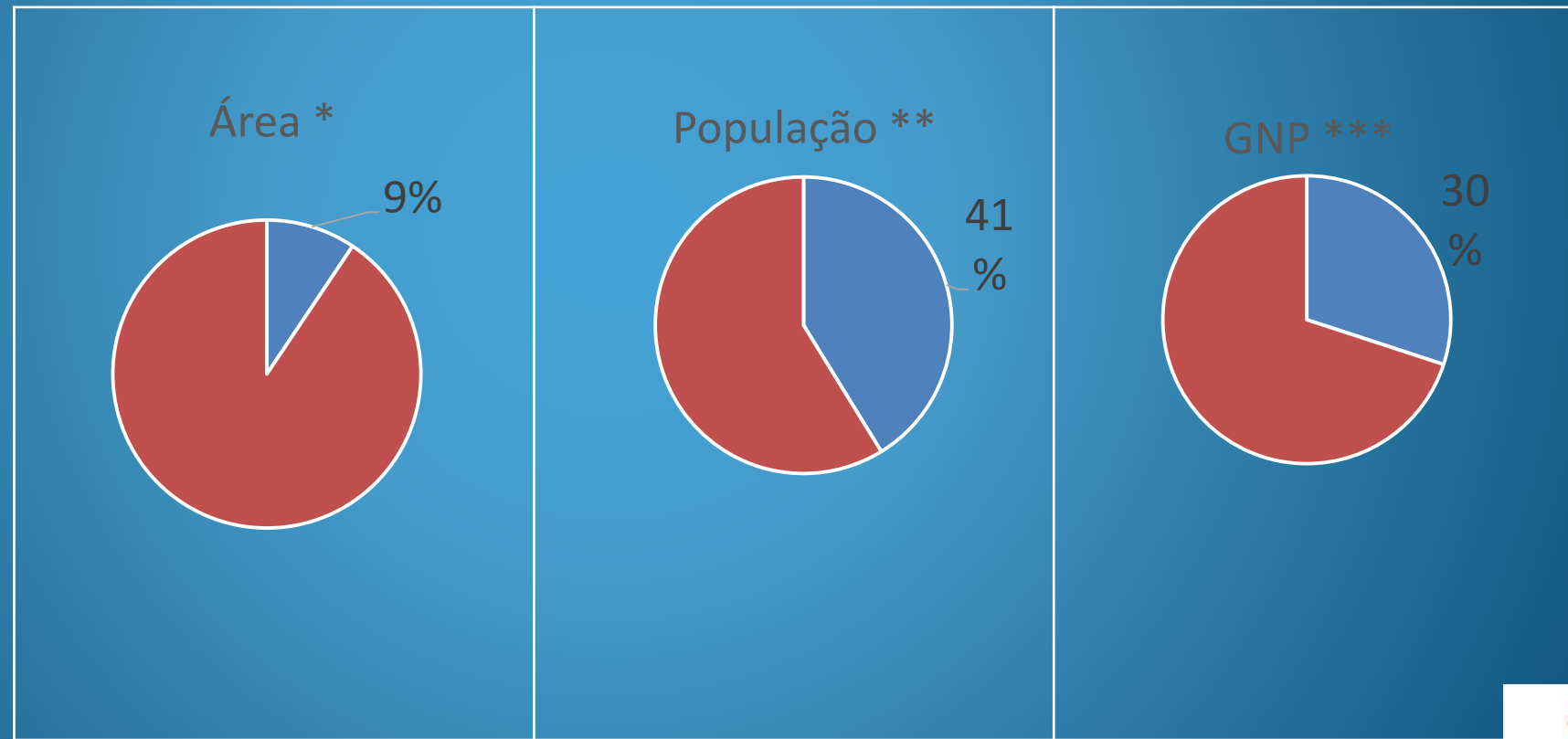
95 k km² (1.1%)

6,7 m people (3.2%)

9 h flight from Miami

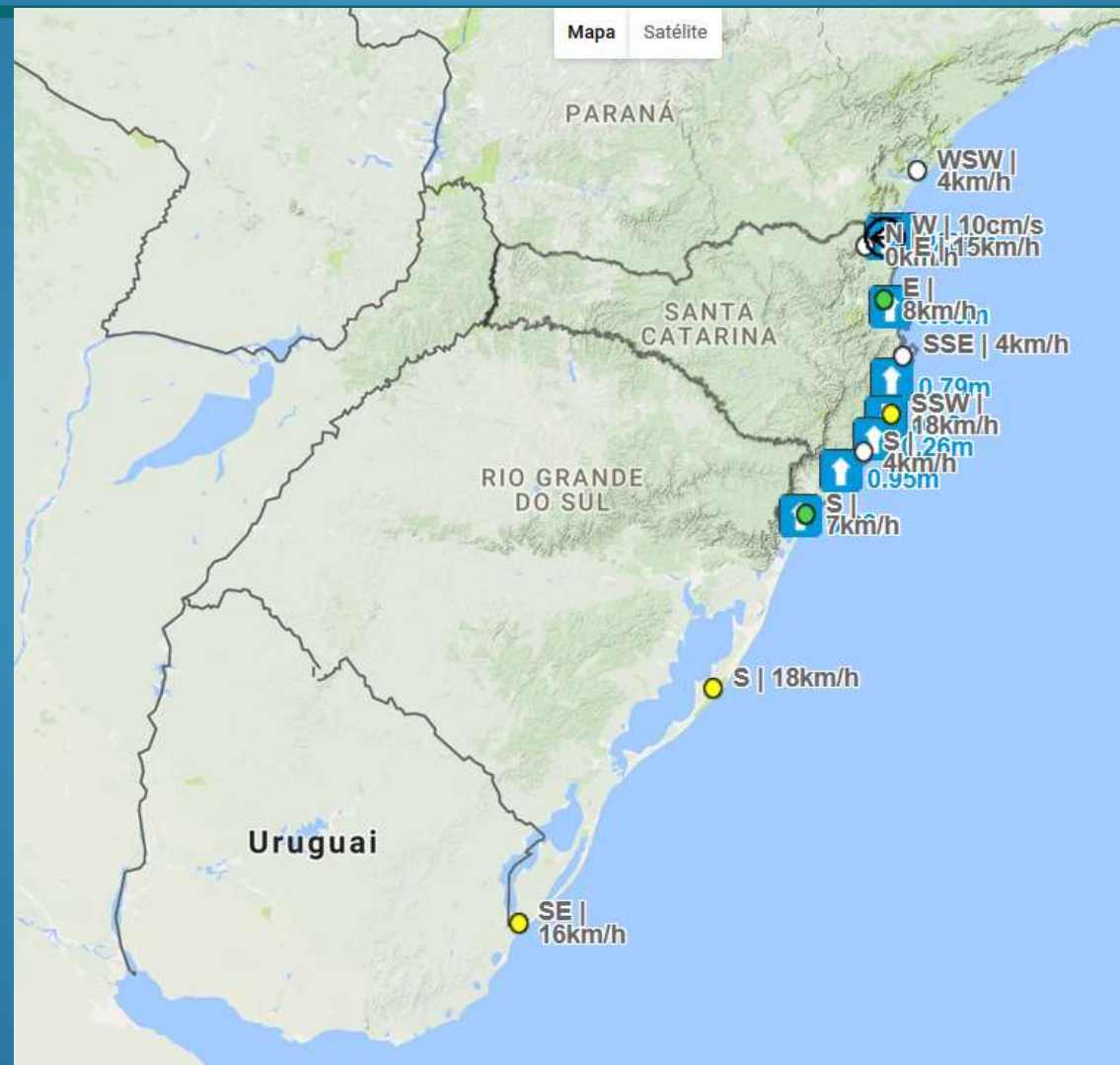


Santa Catarina coast zone statistics...



* Ibge (2015); ** ibge (2016); *** ibge (2014)

E. Litoral On-Line



Nine tide gauges:

- ✓ 1st in 2012
- ✓ 3 more in 2014
- ✓ 3 more in 2016
- ✓ 1 more in 2017

5 in open sea cond.
4 in bays/rivers cond.



1. Florianópolis
(Sul da Ilha)
Jan/2012



2. Porto de Itapoá
Jun/2014



3. Laguna Ago/2014



4. Porto de São
Francisco do Sul
Set/2014



5. Balneário Rincão
Dez/2015



6. Bal Camboriú Fev/2016



7. Porto Imbituba Fev/2016



8. Ilha da paz (SFS)
Junho/2016



9. Passo de Torres
Abril/2017



| | Litoral Norte 2901-Ilha da Paz | Litoral Norte 2903-Itapoá | Litoral Norte 2909-São Francisco | Litoral Norte 2927-Bal Camboriú | Fpolis Litorânea 2951-Florianópolis | Litoral Sul 2963-Imbituba | Litoral Sul 2969-Laguna | Litoral Sul 2975-Bal Rincão | Litoral Sul 2981-Passo de Torres |
|--------------------|-----------------------------------|------------------------------|-------------------------------------|------------------------------------|--|------------------------------|----------------------------|--------------------------------|-------------------------------------|
| Operation (months) | 18 | 42 | 39 | 24 | 48 | 24 | 40 | 24 | 6 |
| 15 min readings | 52,340 | 122,361 | 113,528 | 69,798 | 139,596 | 69,798 | 116,409 | 69,798 | 17,523 |
| Failures (#) | 127 | 2,583 | 2,585 | 1,408 | 466 | 461 | 903 | 6,525 | 2 |
| Failures (%) | 0.2% | 2.1% | 2.3% | 2.0% | 0.3% | 0.7% | 0.8% | 9.3% | 0.0% |

| | Litoral Norte 2901-Ilha da Paz | Litoral Norte 2903-Itapoá | Litoral Norte 2909-São Francisco | Litoral Norte 2927-Bal Camboriú | Fpolis Litorânea 2951-Florianópolis | Litoral Sul 2963-Imbituba | Litoral Sul 2969-Laguna | Litoral Sul 2975-Bal Rincão | Litoral Sul 2981-Passo de Torres |
|--------------------|-----------------------------------|------------------------------|-------------------------------------|------------------------------------|--|------------------------------|----------------------------|--------------------------------|-------------------------------------|
| Average (cm) | 85 | 87 | 90 | 64 | 55 | 47 | 13 | 53 | 36 |
| Maximum (cm) | 213 | 250 | 247 | 170 | 176 | 157 | 83 | 193 | 144 |
| Minimum (cm) | -58 | -68 | -58 | -65 | -62 | -67 | -65 | -49 | -20 |
| Amplitude (cm) | 270 | 318 | 304 | 235 | 238 | 224 | 148 | 242 | 164 |
| Operation (months) | 18 | 42 | 39 | 24 | 48 | 24 | 40 | 24 | 6 |



Instrumento



Leituras e
Processamento



Transmissão

TC65

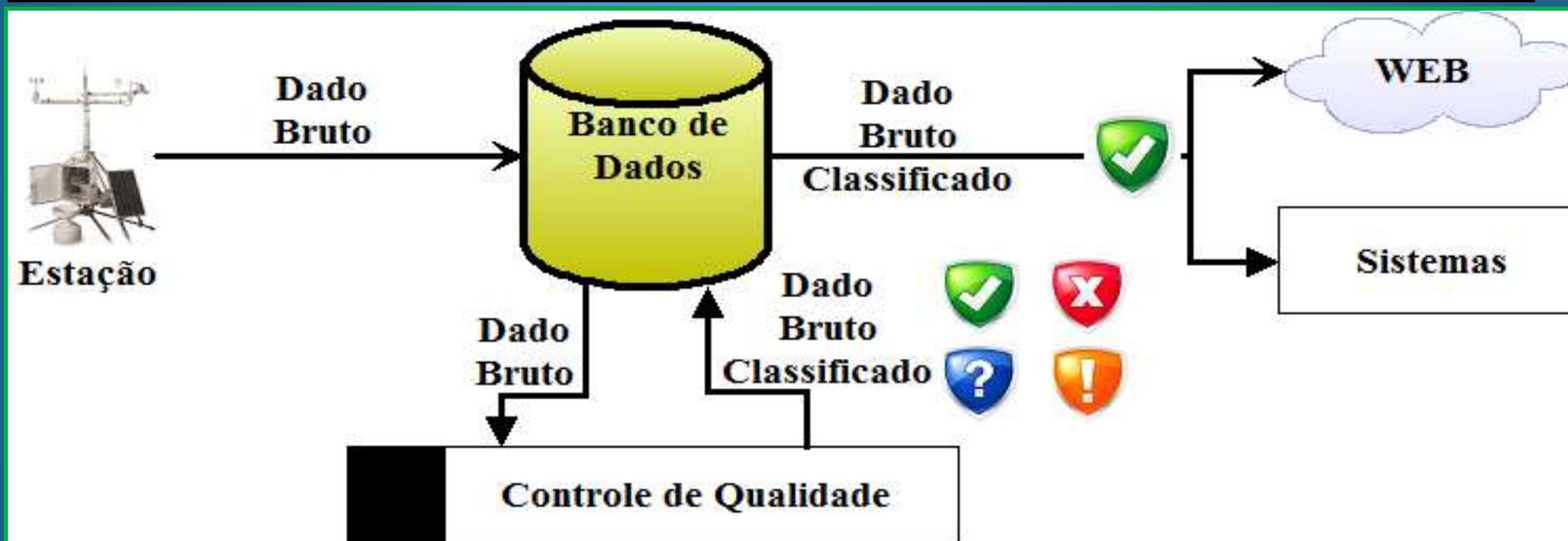
GPRS/Internet

• DATA BANK

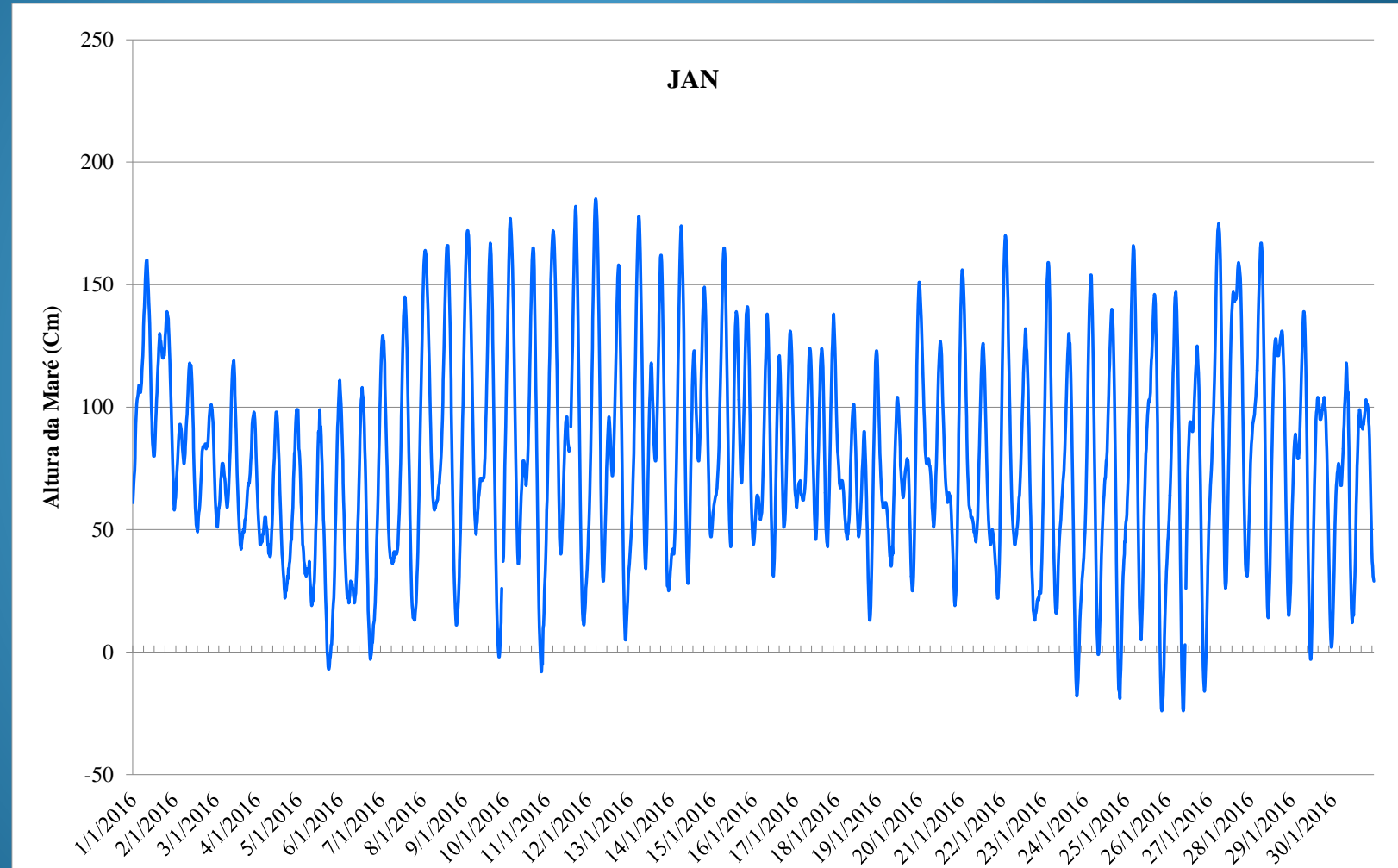
• Infrastructure

- 29 Physical servers;
- 6 Virtual servers;
- 2 Clusters
 - 1 with 360 units, 480 RAM
 - 1 with 160 units, 80 RAM

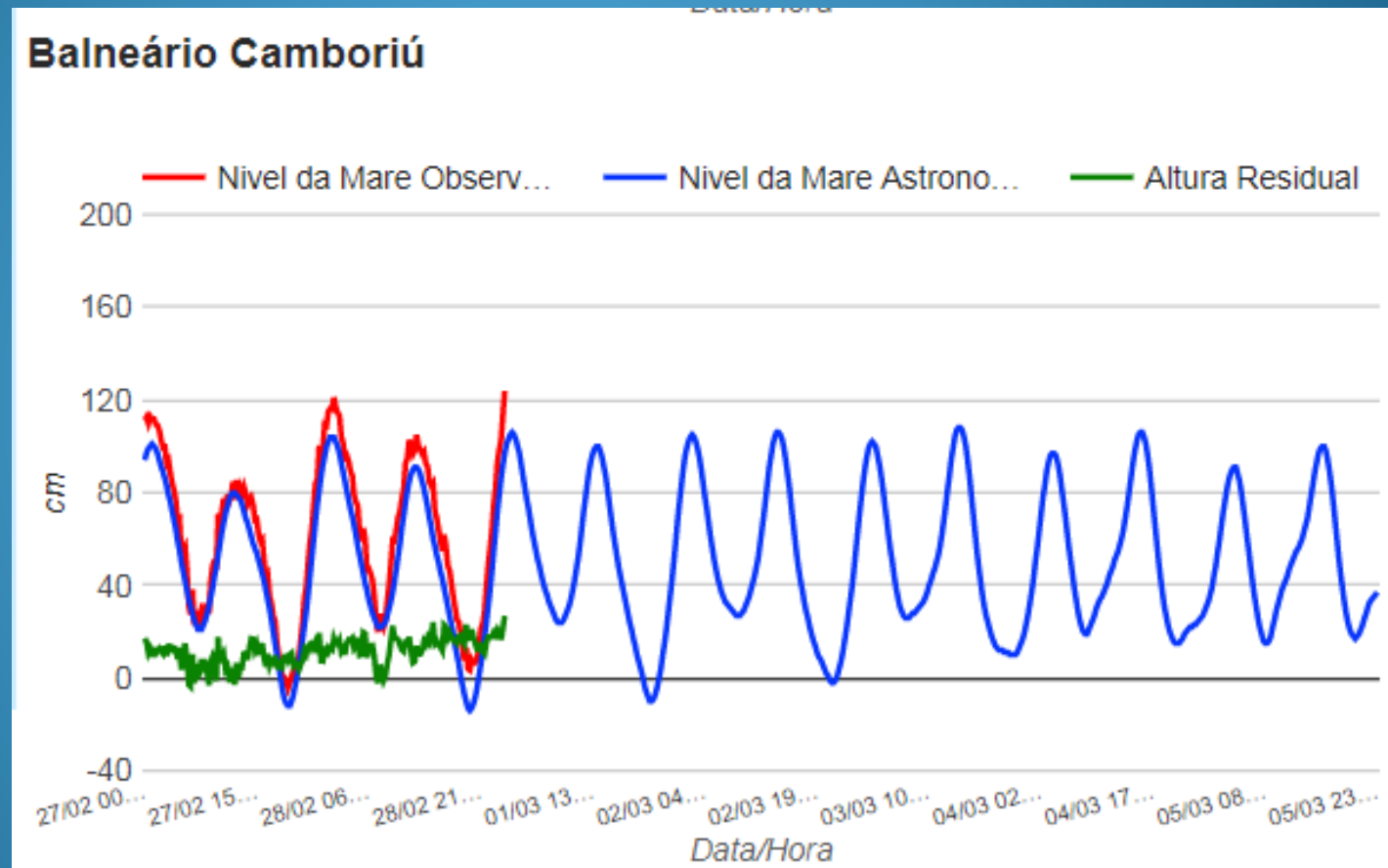
Fluxograma



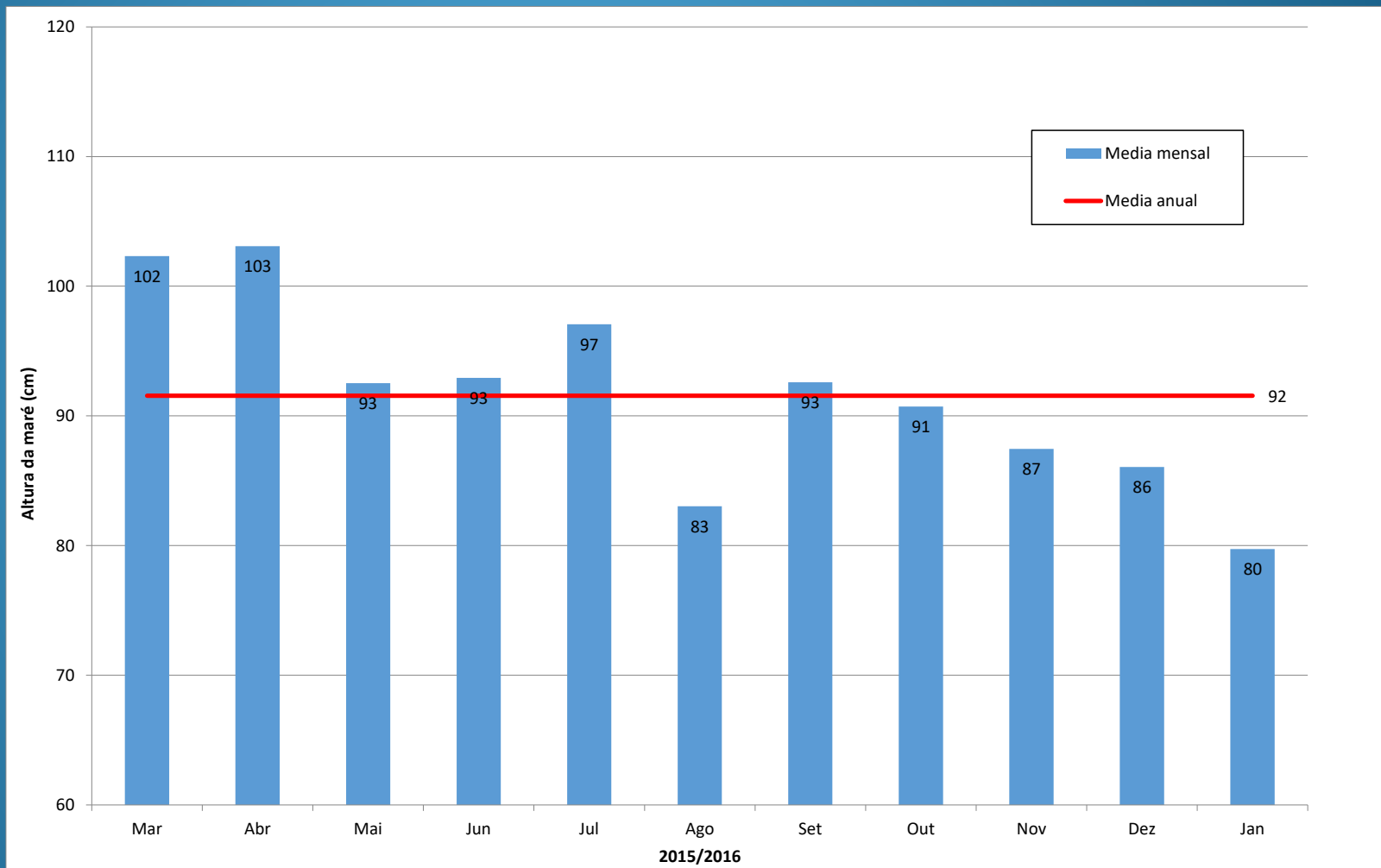
A. Monthly Tide evolution



B. Histórico de dados



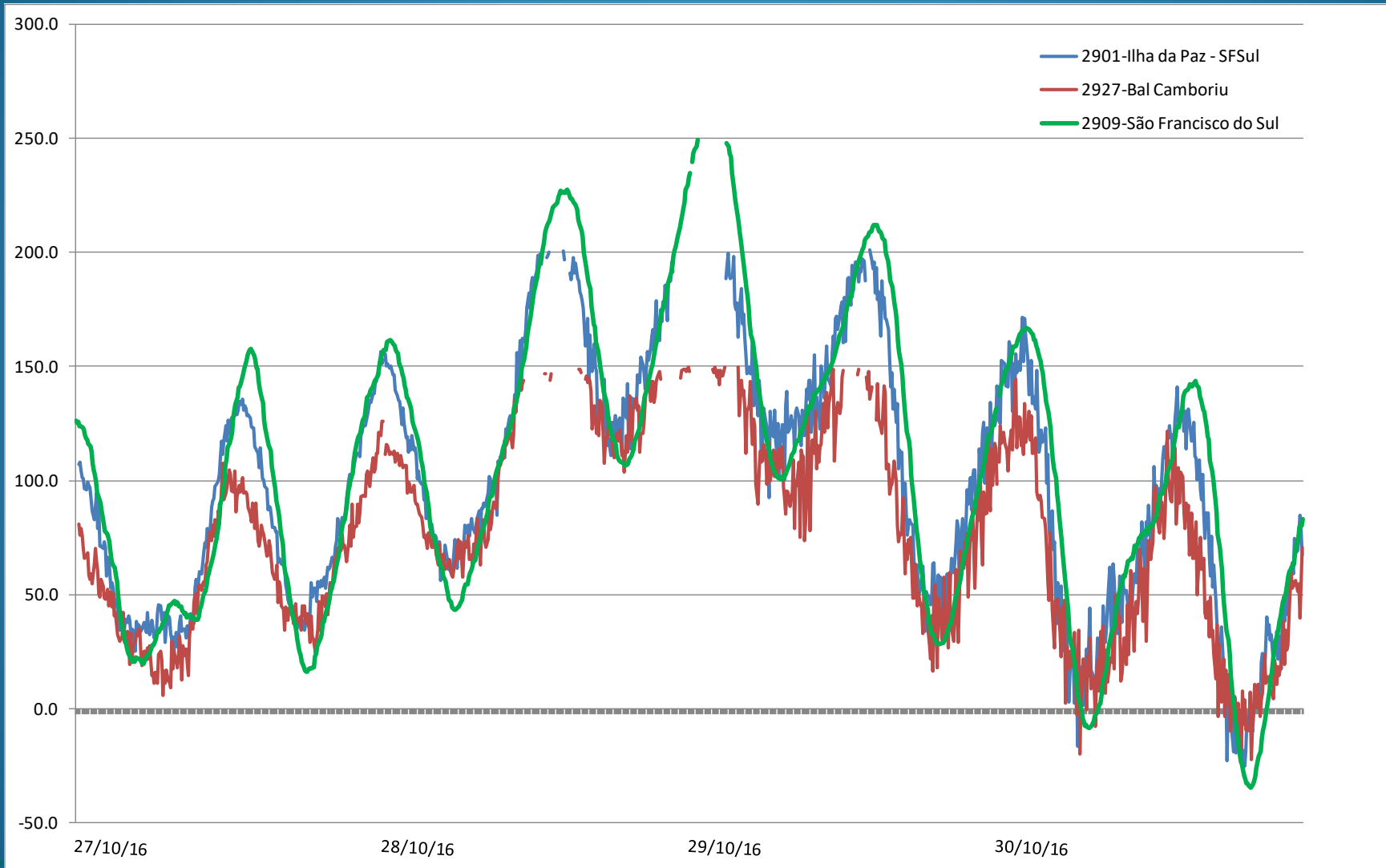
B. Histórico de dados















Maregrafos - Bateria Semana

1 message

ciram@epagri.sc.gov.br <ciram@epagri.sc.gov.br>

To: argeuvanz@epagri.sc.gov.br, matias@epagri.sc.gov.br, nathan@epagri.sc.gov.br

Estacao; Data/Horario; Bateria 04 hs;

2901; 13-11-2017 05:00:44; 13,06;

2903; 13-11-2017 05:00:44; 12,84;

2909; 13-11-2017 05:00:44; 12,81;

2910; 13-11-2017 05:00:44; 12,83;

2927; 13-11-2017 05:00:44; 12,8;

2951; 13-11-2017 05:00:44; 12,88;

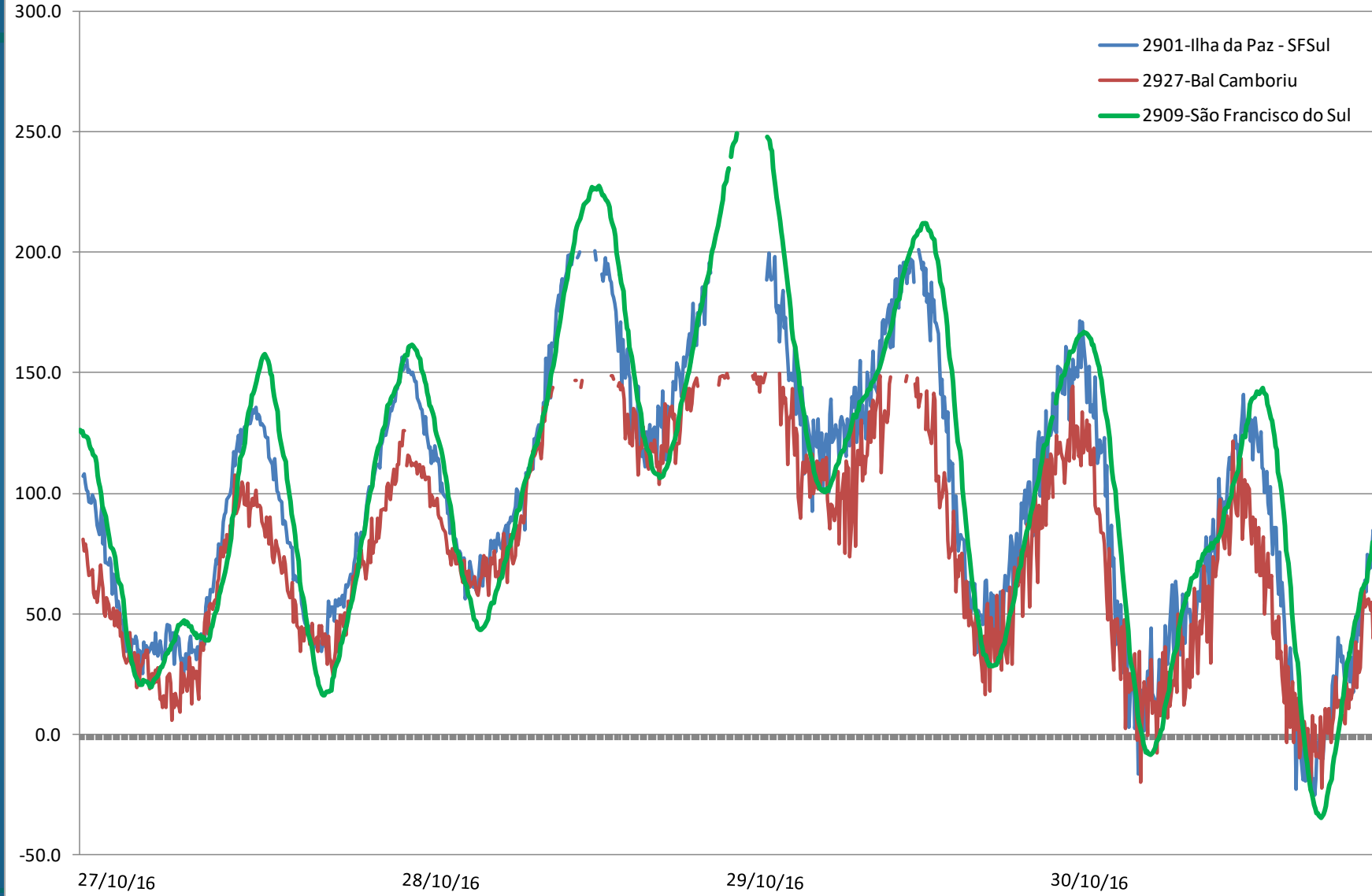
2963; 13-11-2017 05:00:44; 12,82;

2969; 13-11-2017 05:00:44; 12,82;

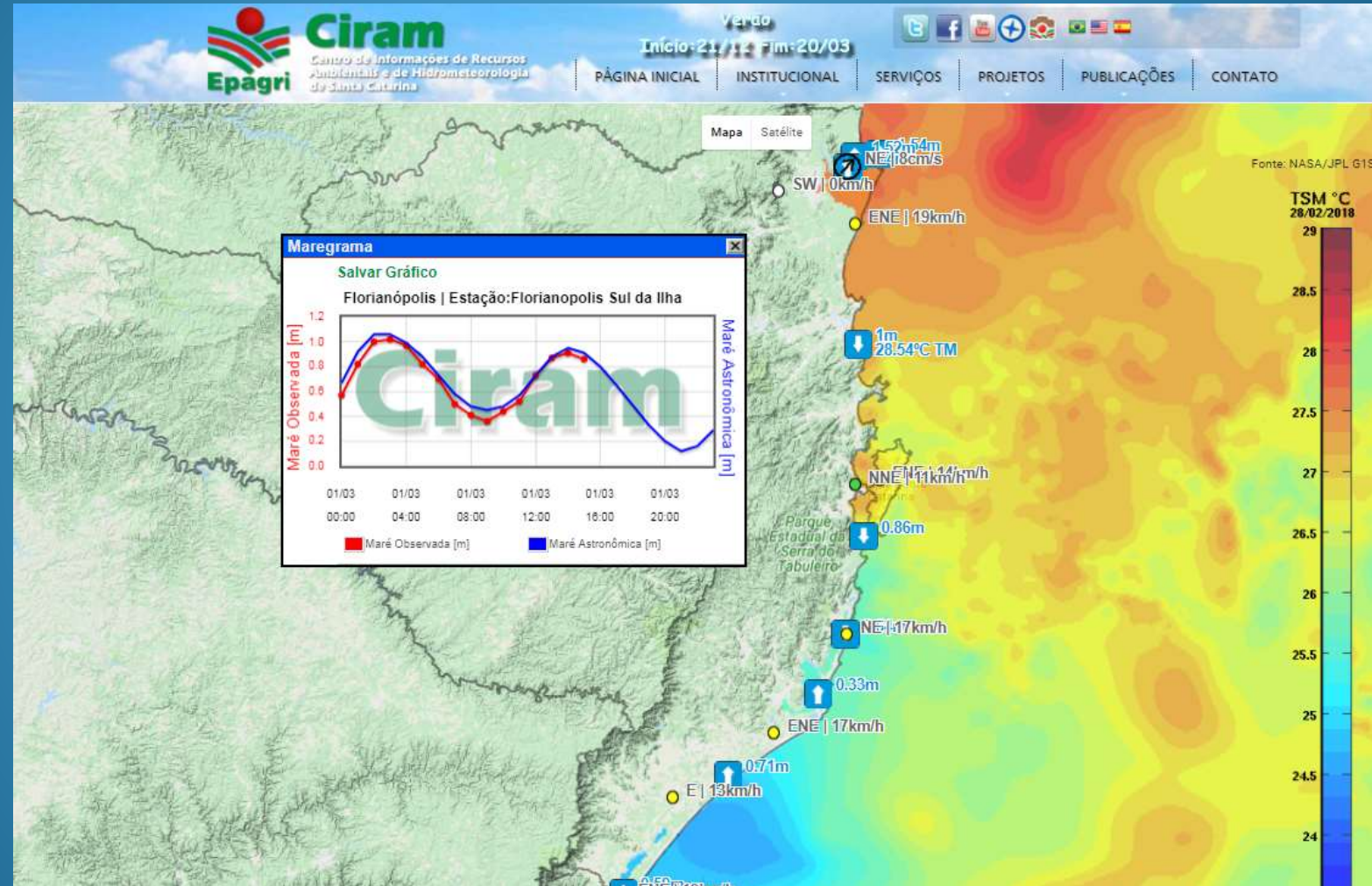
2975; 13-11-2017 05:00:44; 12,74;

2981; 13-11-2017 05:00:44; 12,88;

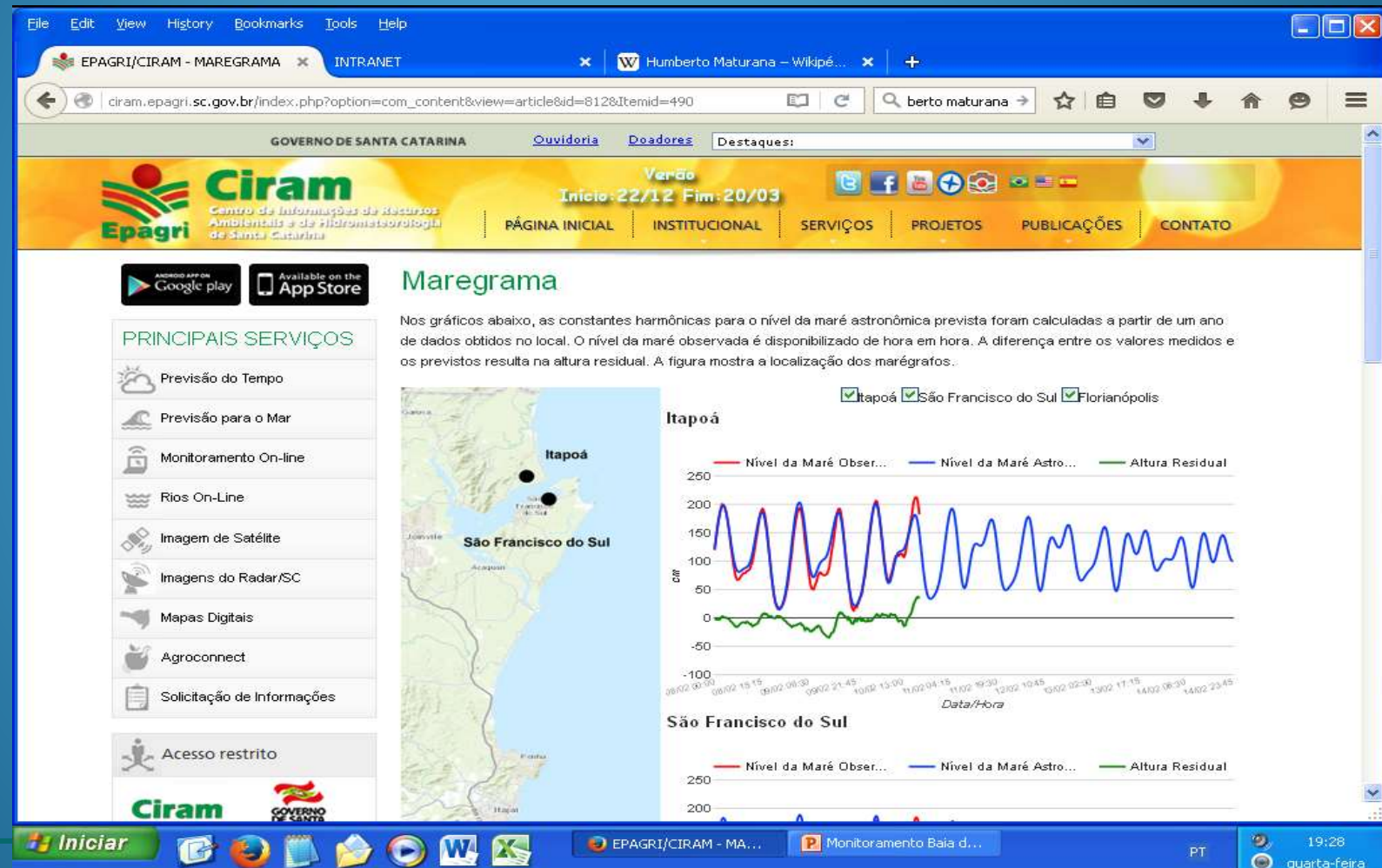




E. Litoral On-Line



D. Marigram

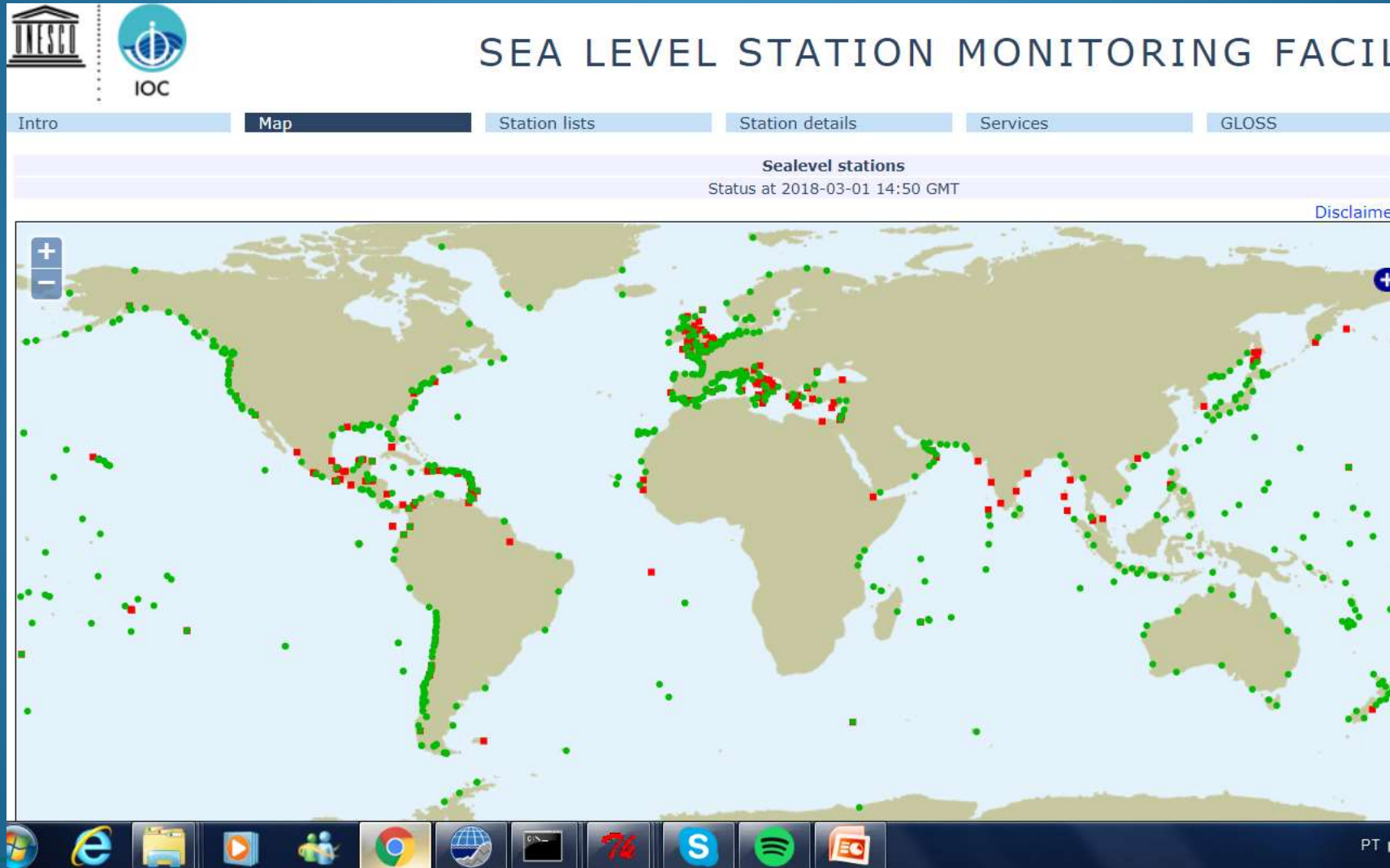


The screenshot shows a web browser window displaying the Ciram website. The browser's address bar shows the URL: `ciram.epagri.sc.gov.br/index.php?option=com_content&view=article&id=812&Itemid=490`. The website header includes the Ciram logo, navigation links (PÁGINA INICIAL, INSTITUCIONAL, SERVIÇOS, PROJETOS, PUBLICAÇÕES, CONTATO), and a version indicator: "Versão Início: 22/12 Fim: 20/03".

The main content area is titled "Maregrama" and contains a text block: "Nos gráficos abaixo, as constantes harmônicas para o nível da maré astronômica prevista foram calculadas a partir de um ano de dados obtidos no local. O nível da maré observada é disponibilizado de hora em hora. A diferença entre os valores medidos e os previstos resulta na altura residual. A figura mostra a localização dos marégrafos." Below the text is a map of the southern coast of Santa Catarina, highlighting the locations of Itapoá and São Francisco do Sul.

Two line graphs are displayed, one for Itapoá and one for São Francisco do Sul. Each graph plots three data series over time (from 08:02 to 14:02): "Nível da Maré Obser..." (observed tide level, red line), "Nível da Maré Astro..." (predicted astronomical tide level, blue line), and "Altura Residual" (residual height, green line). The y-axis represents height in centimeters (cm), ranging from -100 to 250. The x-axis represents "Data/Hora" (Date/Time).

On the left side of the page, there is a sidebar titled "PRINCIPAIS SERVIÇOS" (Main Services) with the following items: Previsão do Tempo, Previsão para o Mar, Monitoramento On-line, Rios On-Line, Imagem de Satélite, Imagens do Radar/SC, Mapas Digitais, Agroconnect, Solicitação de Informações, and Acesso restrito.



The screenshot shows the 'SEA LEVEL STATION MONITORING FACILITY' website. At the top left are the UNESCO and IOC logos. The main title is 'SEA LEVEL STATION MONITORING FACILITY'. Below the title is a navigation menu with tabs: 'Intro', 'Map' (selected), 'Station lists', 'Station details', 'Services', and 'GLOSS'. The main content area is titled 'Sealevel stations' with a subtitle 'Status at 2018-03-01 14:50 GMT' and a 'Disclaimer' link. The central feature is a world map with numerous green and red markers representing sea level stations. At the bottom of the screenshot is a Windows taskbar with various application icons.