



**Sistema Integrado de Monitoramento e Alerta**

**Hidrometeorológico - SipamHidro**

# Prognósticos Hidrológicos Hidrológicos para a Amazônia – Cotas Mínimas Mínimas Mensajs

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Coordenação de Hidrologia

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Assessor

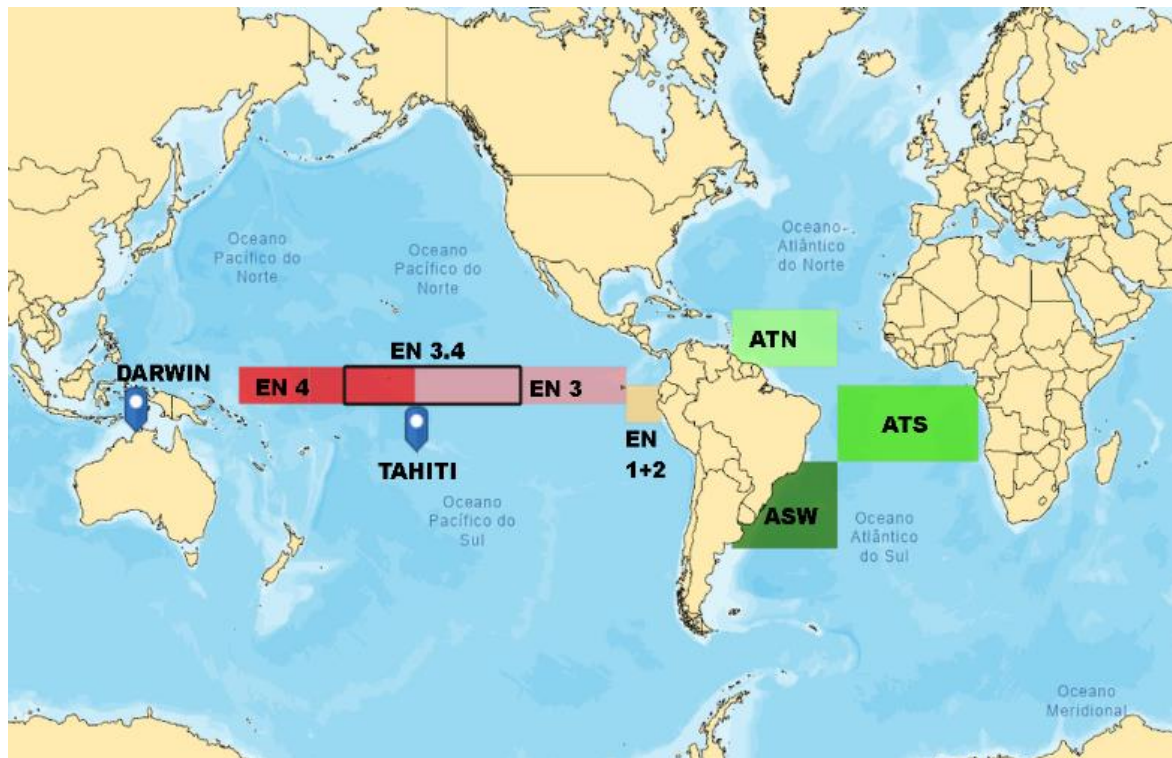


Dados médios mensais da TSM (NCEP/NCAR):

- Oceano Pacífico, Oceano Atlântico Norte, Sul e Sudoeste.
- Pressão atmosférica em Darwin e Tahiti.

Dados de anomalias obtidos a partir das séries históricas dos níveis dos rios

- Anomalia Negativa
  - Fraca ( 1DP)
  - Moderada (1.5DP)
  - Severa (2DP)





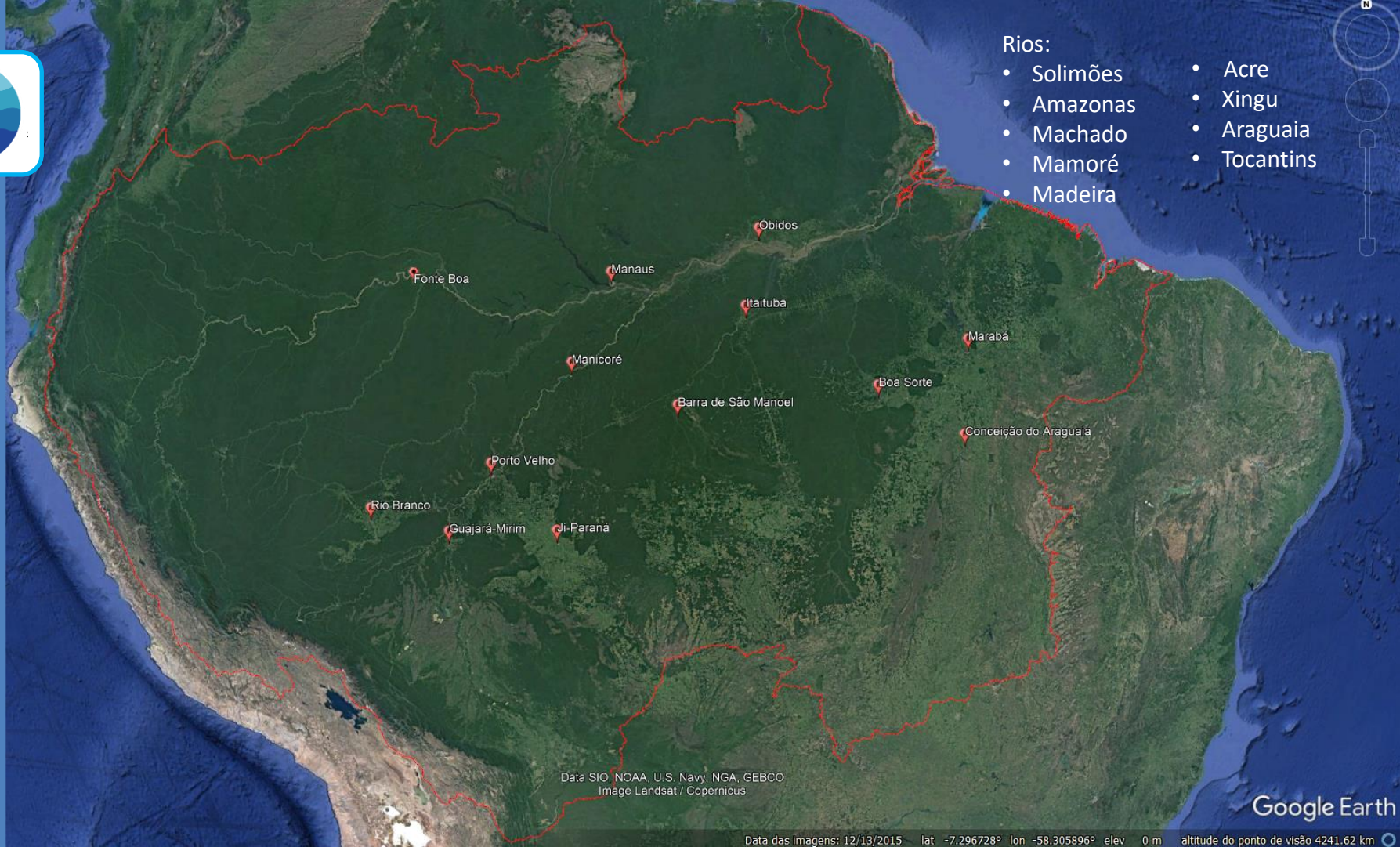
A eficiência dos modelos foram avaliadas através dos Coeficiente de Correlação de PEARSON (  $r$  – muito forte: 0,85 a 0,95 ) e de NASH-Sutcliffe (  $C_{NS}$  – muito forte: 0,77 a 0,90 ).

	Rio Madeira			
Teste	Guajará Mirim	Ji-Paraná	Porto Velho	Manicoré
$r$	0,92 a 0,95	0,92 a 0,95	0,93 a 0,95	0,92 a 0,95
$C_{NS}$	0,80 a 0,89	0,80 a 0,89	0,84 a 0,87	0,80 a 0,89

	Rio Acre	Rio Solimões		Rio Amazonas
Teste	Rio Branco	Fonte Boa	Manaus	Óbidos
$r$	0,92 a 0,95	0,89 a 0,92	0,89 a 0,92	0,92 a 0,95
$C_{NS}$	0,80 a 0,89	0,77 a 0,80	0,77 a 0,80	0,88 a 0,90

	Rio Tapajós		Rio Araguaia	Rio Tocantins
Teste	Barra de São Manuel	Itaituba	Conceição do Araguaia	Marabá
$r$	0,90 a 0,92	0,93 a 0,95	0,92 a 0,95	0,86 a 0,90
$C_{NS}$	0,82 a 0,84	0,84 a 0,88	0,88 a 0,90	0,80 a 0,90





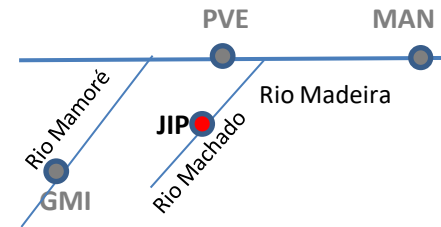
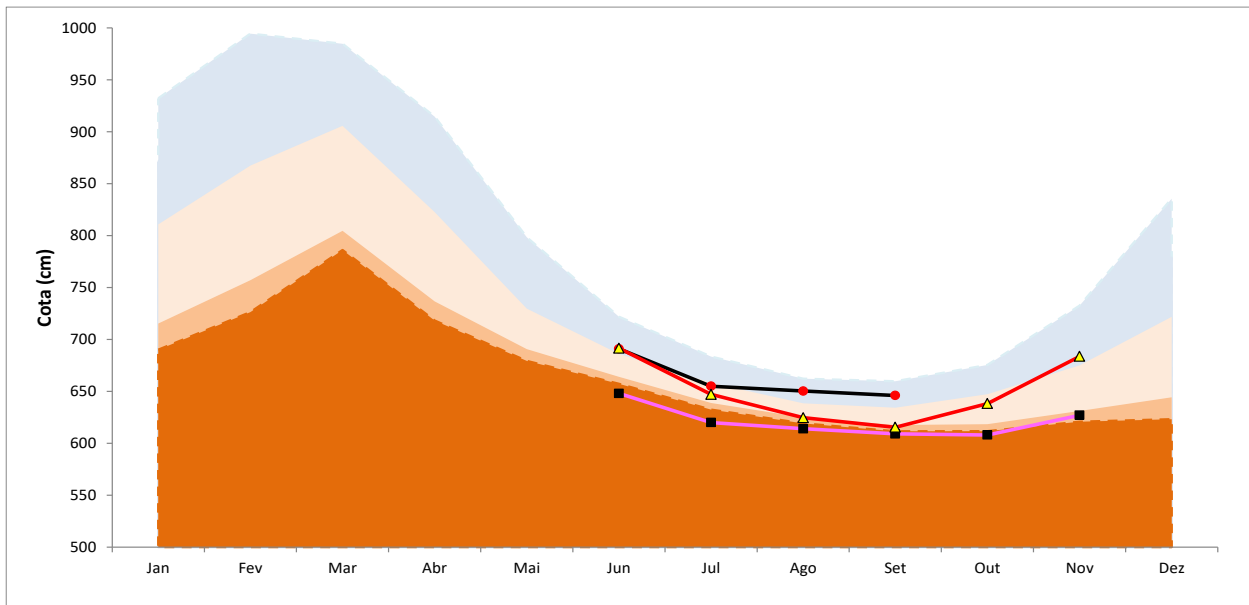
Rios:

- Solimões
- Amazonas
- Machado
- Mamoré
- Madeira
- Acre
- Xingu
- Araguaia
- Tocantins

Óbidos  
Manaus  
Itaituba  
Manicoré  
Barra de São Manoel  
Boa Sorte  
Marabá  
Conceição do Araguaia  
Porto Velho  
Rio Branco  
Guajará-Mirim  
Ji-Paraná

Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
Image Landsat / Copernicus

# Nível Fluviométrico Rio Machado (Ji-Paraná-RO)

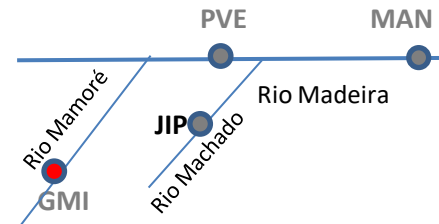
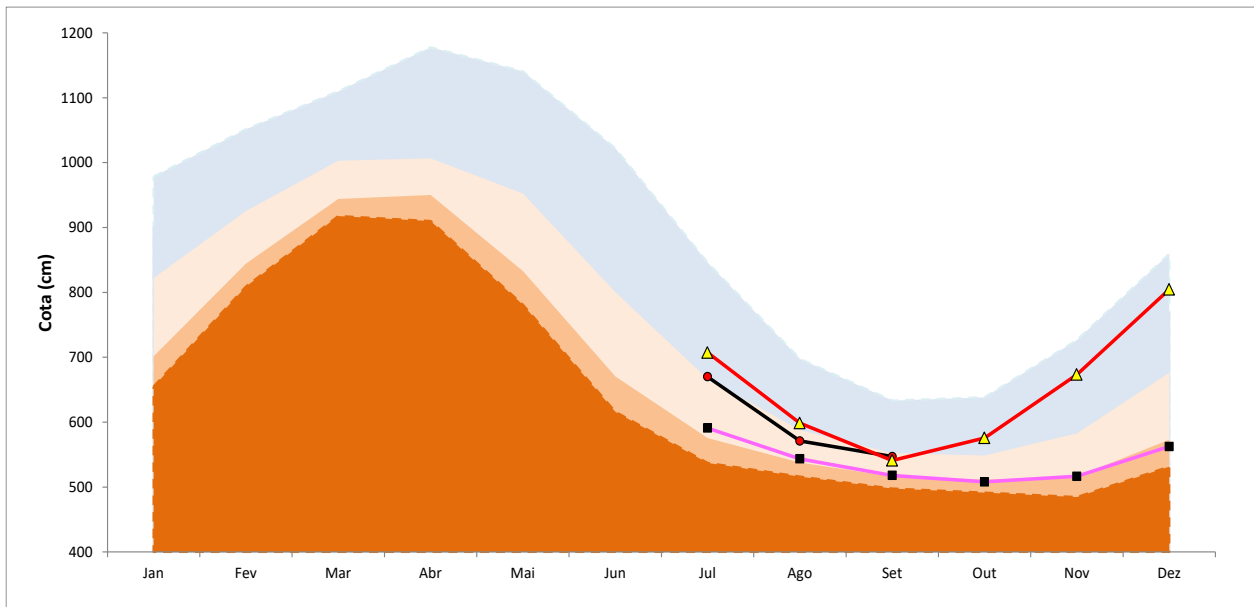


## Legenda:

- Anomalia Fraca
- Normalidade
- Anomalia Negativa Fraca
- Anomalia Negativa Moderada
- Anomalia Negativa Severa
- Obs
- Hno
- ▲ Hmp1
- ◆ Hmp2

	Meses					
	Jun	Jul	Ago	Set	Out	Nov
<b>Obs</b>	691.0	655.0	650.3	646.0		
<b>Hno</b>	648.0	620.0	614.0	609.0	608.0	627.0
<b>Hmp1</b>	691.6	647.1	624.6	<b>615.4</b>	638.3	683.7
<b>Dif (Obs-Hmp1)</b>	-0.6	7.9	25.7	<b>30.6</b>		
<b>Acerto (%)</b>	99.9	98.8	96.0	<b>95.3</b>		

# Nível Fluviométrico Rio Mamoré (Guajar Mirim-RO)

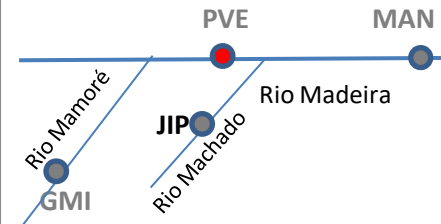
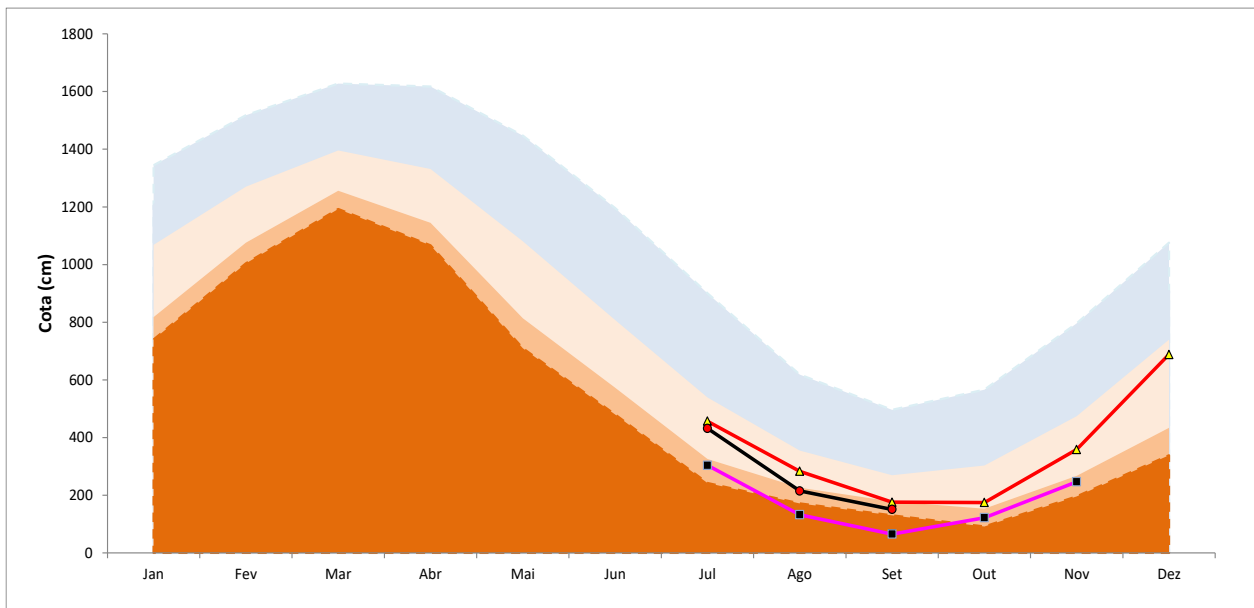


## Legenda:

- Anomalia Fraca
- Normalidade
- Anomalia Negativa Fraca
- Anomalia Negativa Moderada
- Anomalia Negativa Severa
- Obs
- Hno
- ▲ Hmp1
- ◆ Hmp2

	Meses					
	Jul	Ago	Set	Out	Nov	Dez
<b>Obs</b>	670.0	571.0	547.0			
<b>Hno</b>	591.0	543.5	518.0	508.0	516.5	562.5
<b>Hmp1</b>	707.4	598.6	<b>541.1</b>	575.7	673.5	804.6
<b>Dif (Obs-Hmp1)</b>	<b>-37.4</b>	<b>-27.6</b>	<b>5.9</b>			
<b>Acerto (%)</b>	94.4	95.2	<b>98.9</b>			

# Nível Fluviométrico Rio Madeira (Porto Velho-RO)

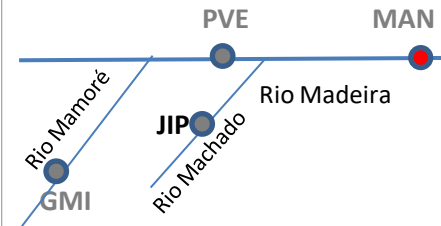
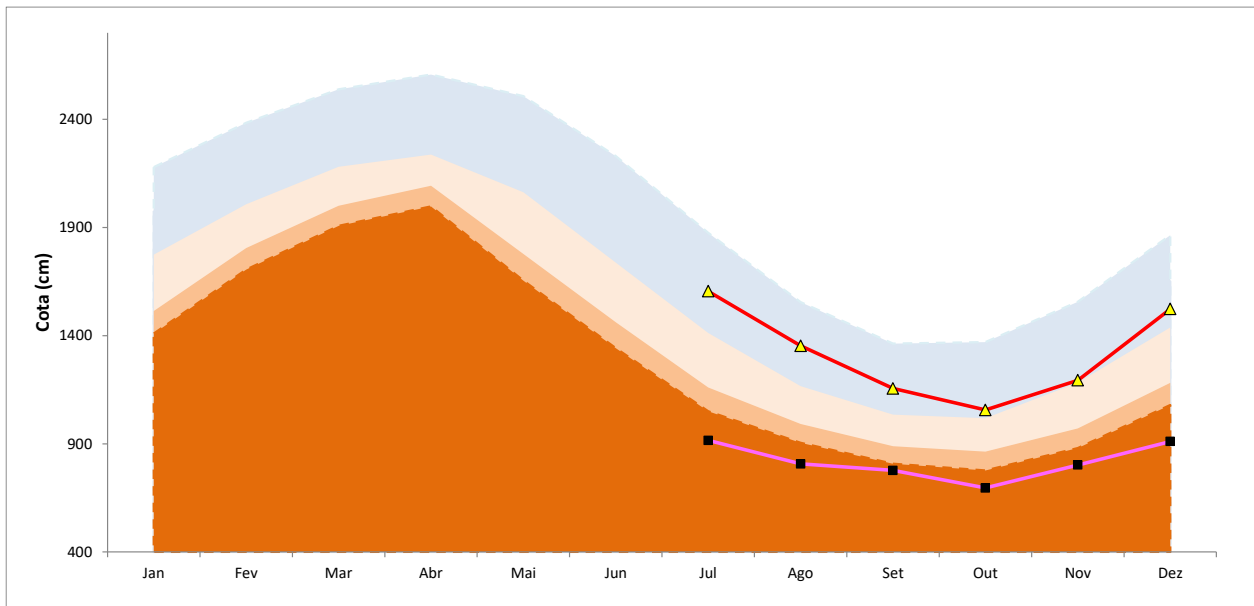


## Legenda:

- Anomalia Fraca
- Normalidade
- Anomalia Negativa Fraca
- Anomalia Negativa Moderada
- Anomalia Negativa Severa
- Obs
- Hno
- ▲ Hmp1
- ◆ Hmp2

	Meses					
	Jul	Ago	Set	Out	Nov	Dez
<b>Obs</b>	432.0	215.0	151.0			
<b>Hno</b>	304.0	132.5	65.4	122.2	247.0	288.0
<b>Hnp1</b>	456.9	283.0	176.1	<b>175.1</b>	359.0	688.1
<b>Dif (Obs-Hnp1)</b>	<b>-24.9</b>	<b>-68.0</b>	<b>-25.1</b>			
<b>Acerto (%)</b>	94.2	68.4	<b>83.4</b>			

# Nível Fluviométrico Rio Madeira (Manicoré-AM)



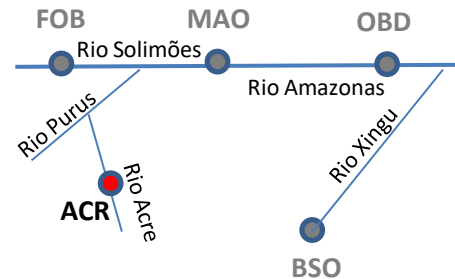
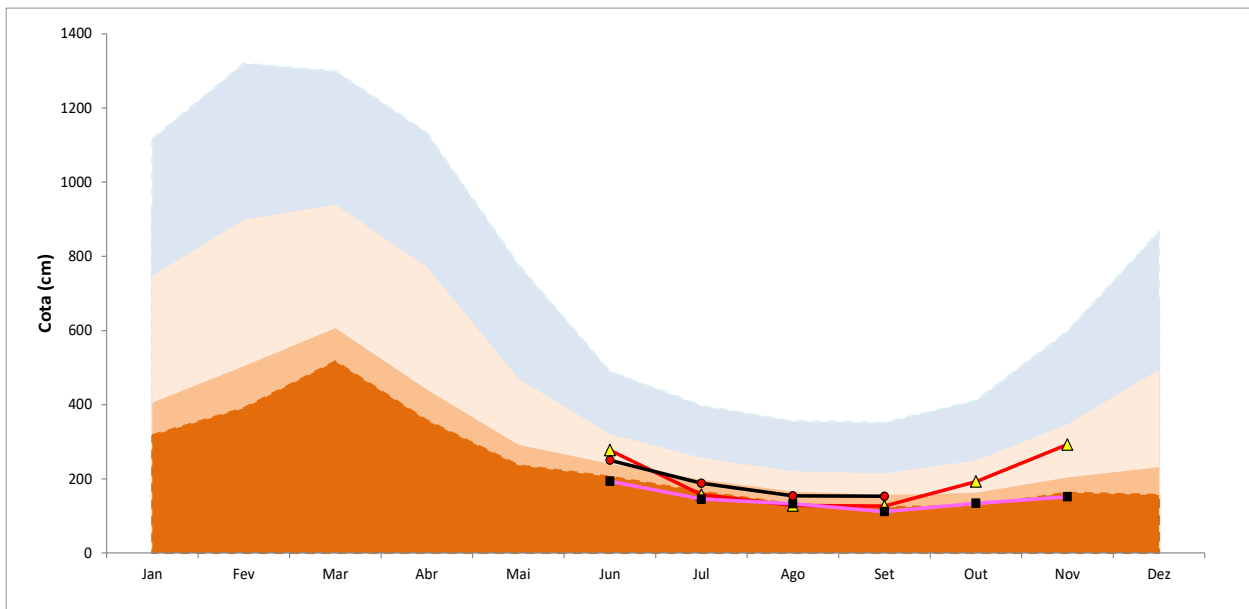
## Legenda:

- Anomalia Fraca
- Normalidade
- Anomalia Negativa Fraca
- Anomalia Negativa Moderada
- Anomalia Negativa Severa
- Obs
- Hno
- ▲ Hmp1
- ◆ Hmp2

	Meses					
	Jul	Ago	Set	Out	Nov	Dez
<b>Obs</b>						
<b>Hno</b>	916.0	807.0	777.0	696.0	802.0	911.0
<b>Hnp1</b>	1605.3	1352.9	1156.0	<b>1056.6</b>	1193.9	1523.1
<b>Dif (Obs-Hnp1)</b>						
<b>Acerto-p1 (%)</b>						



# Nível Fluviométrico Rio Acre (Rio Branco-AC)

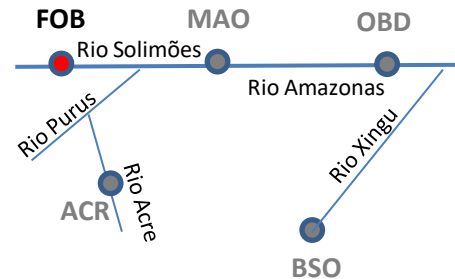
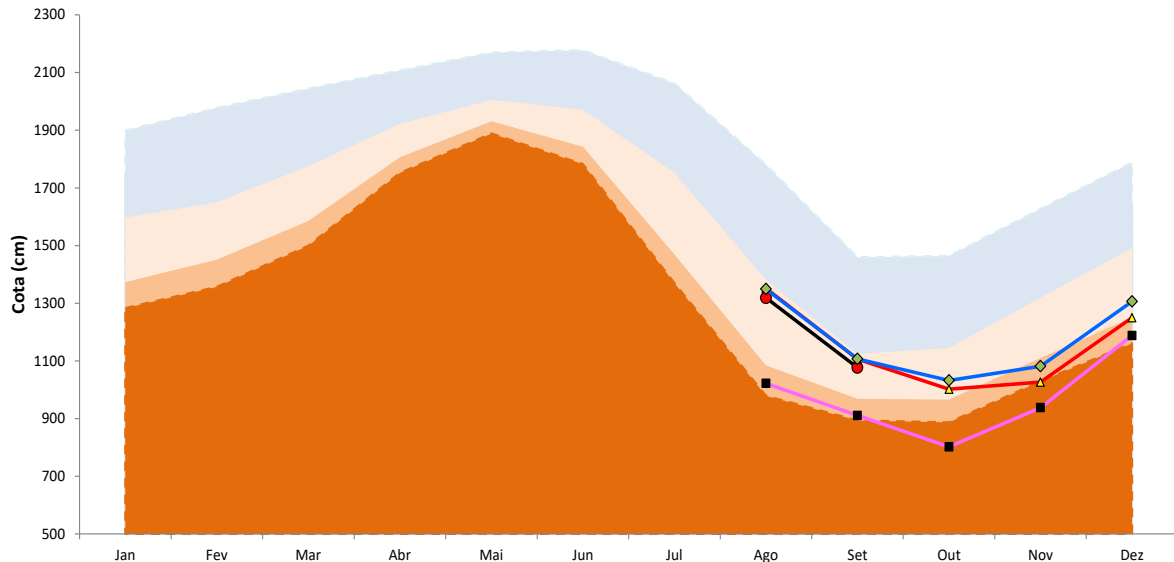


## Legenda:

- Anomalia Fraca
- Normalidade
- Anomalia Negativa Fraca
- Anomalia Negativa Moderada
- Anomalia Negativa Severa
- Obs
- Hno
- ▲ Hmp1
- ◆ Hmp2

	Meses					
	Jun	Jul	Ago	Set	Out	Nov
<b>Obs</b>	250.0	188.0	154.0	153.0		
<b>Hno</b>	193.5	145.5	133.0	111.5	134.0	151.5
<b>Hmp1</b>	277.3	157.2	127.9	<b>126.6</b>	192.6	292.4
<b>Dif (Obs-Hmp1)</b>	<b>-27.3</b>	<b>30.8</b>	<b>26.1</b>	<b>26.4</b>		
<b>Acerto (%)</b>	89.1	83.6	83.1	<b>82.7</b>		

# Nível Fluviométrico Rio Solimões (Fonte Boa-AM)



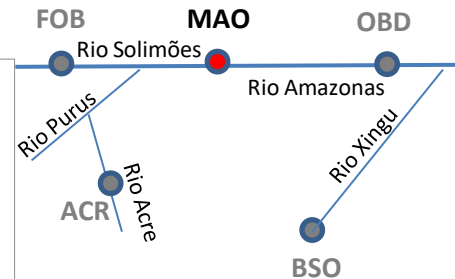
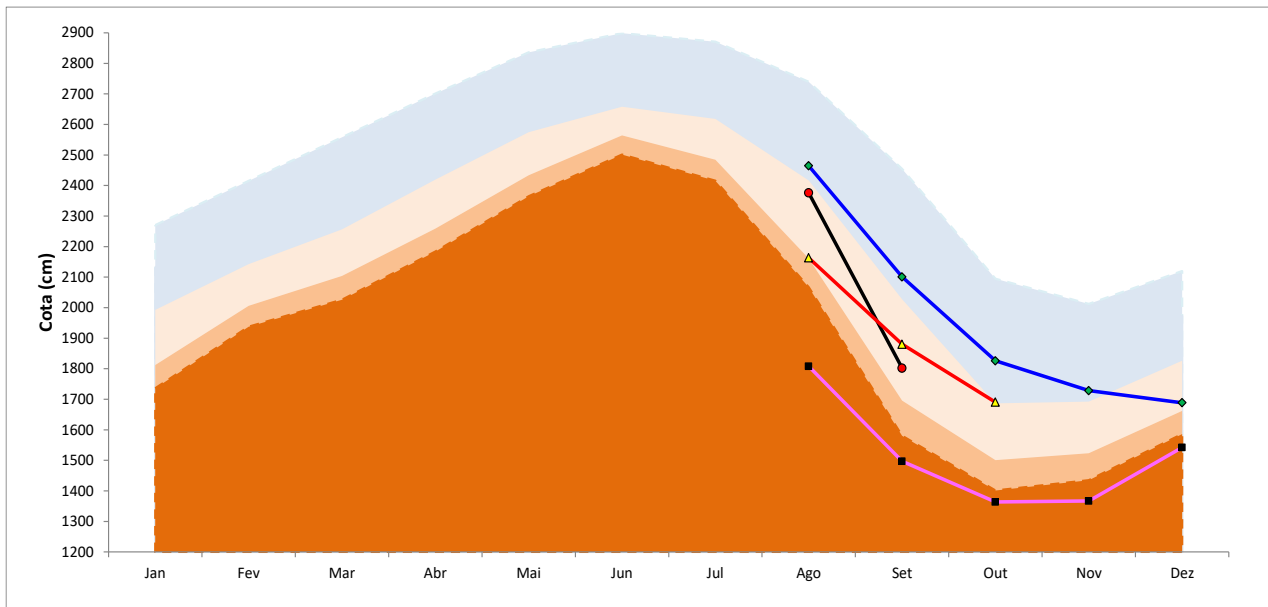
## Legenda:

- Anomalia Fraca
- Normalidade
- Anomalia Negativa Fraca
- Anomalia Negativa Moderada
- Anomalia Negativa Severa
- Obs
- Hno
- ▲ Hmp1
- ◆ Hmp2

	Meses				
	Ago	Set	Out	Nov	Dez
<b>Obs</b>	1319.0	1077.0			
<b>Hno</b>	1022.0	911.0	802.0	938.0	1188.0
<b>Hmp1</b>	1351.9	1106.0	<b>1002.0</b>	1026.5	1249.7
<b>Hmp2</b>	1349.2	1107.1	<b>1032.3</b>	1081.7	1306.2
<b>Dif (Obs-Hmp1)</b>	-32.9	-29.0			
<b>Dif (Obs-Hmp2)</b>	-30.2	-30.1			
<b>Acerto-p1 (%)</b>	97.5	97.3			
<b>Acerto-p2 (%)</b>	97.7	97.2			



# Nível Fluviométrico Rio Solimões (Manaus-AM)

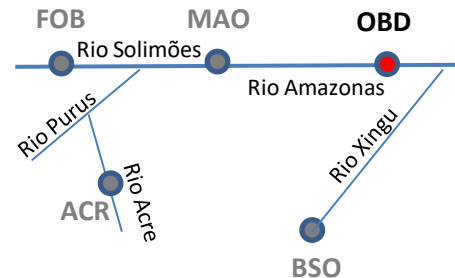
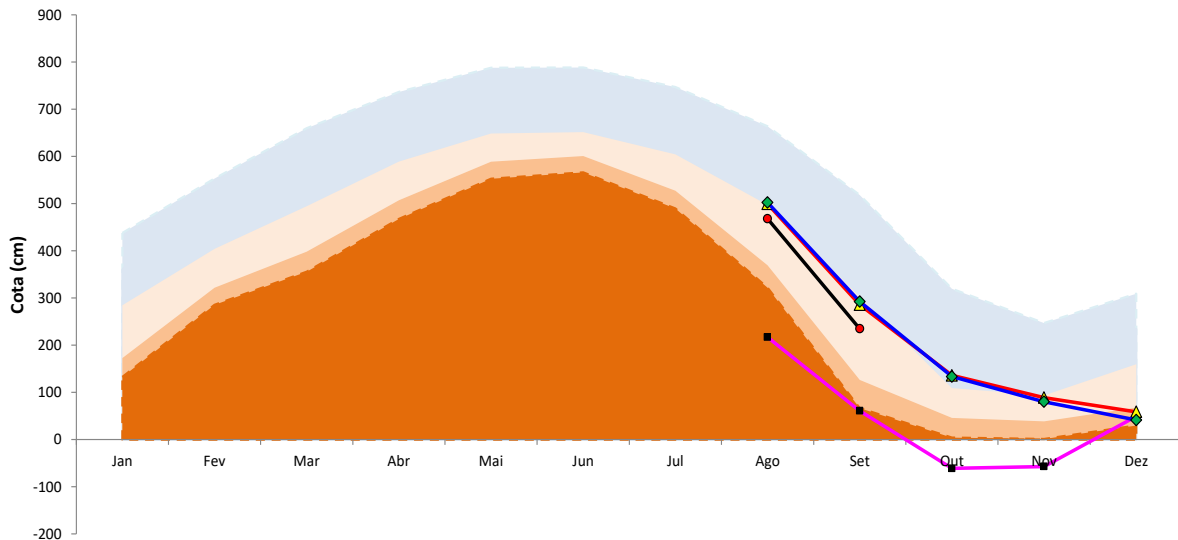


## Legenda:

- Anomalia Fraca
- Normalidade
- Anomalia Negativa Fraca
- Anomalia Negativa Moderada
- Anomalia Negativa Severa
- Obs
- Hno
- ▲ Hmp1
- ◆ Hmp2

	Meses				
	Ago	Set	Out	Nov	Dez
<b>Obs</b>	2376	1802			
<b>Hno</b>	1808	1497	1364	1367	1542
<b>Hmp1</b>	2163	1880	1691		
<b>Hmp2</b>	2465	2101	1826	1728	1689
<b>Dif (Obs-Hmp1)</b>	213	496			
<b>Dif (Obs-Hmp2)</b>	-657	-293			
<b>Acerto-p1 (%)</b>	91.0	95.7			
<b>Acerto-p2 (%)</b>	63.7	59.7			

# Nível Fluviométrico Rio Amazonas (Óbidos-PA)



## Legenda:

- Anomalia Fraca
- Normalidade
- Anomalia Negativa Fraca
- Anomalia Negativa Moderada
- Anomalia Negativa Severa
- Obs
- Hno
- ▲ Hmp1
- ◆ Hmp2

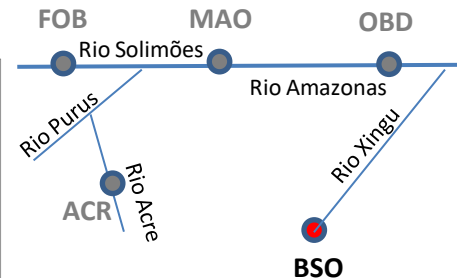
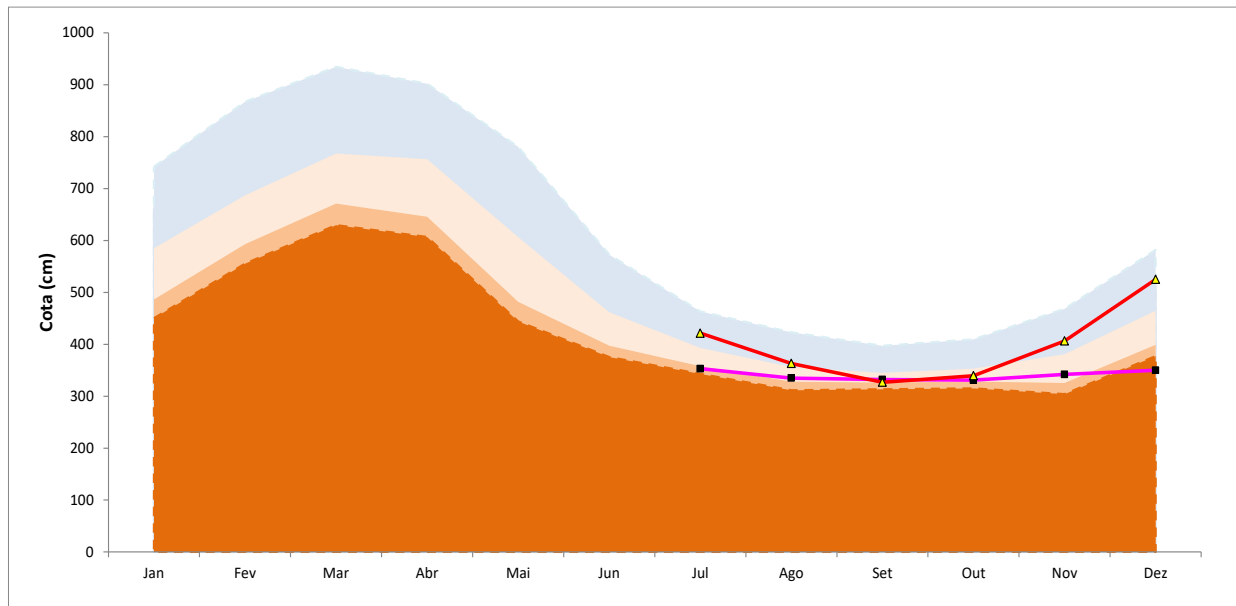
	Meses				
	Ago	Set	Out	Nov	Dez
<b>Obs</b>	1319.0	1077.0			
<b>Hno</b>	1022.0	911.0	802.0	938.0	1188.0
<b>Hmp1</b>	1351.9	1106.0	<b>1002.0</b>	1026.5	1249.7
<b>Hmp2</b>	1349.2	1107.1	<b>1032.3</b>	1081.7	1306.2
<b>Dif (Obs-Hmp1)</b>	-32.9	-29.0			
<b>Dif (Obs-Hmp2)</b>	-30.2	-30.1			
<b>Acerto-p1 (%)</b>	97.5	97.3			
<b>Acerto-p2 (%)</b>	97.7	97.2			



# Nível Fluviométrico Rio Xingu (Boa Sorte-PA)



Prognóstico de Longo Prazo



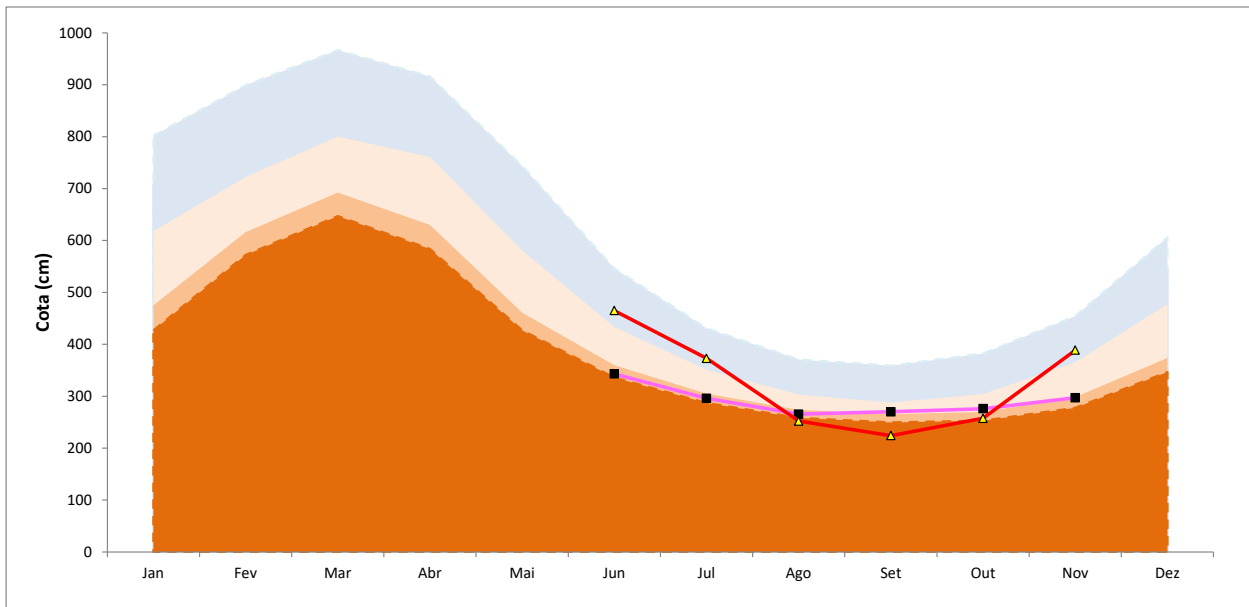
## Legenda:

- Anomalia Fraca
- Normalidade
- Anomalia Negativa Fraca
- Anomalia Negativa Moderada
- Anomalia Negativa Severa
- Obs
- Hno
- ▲ Hmp1
- ◆ Hmp2

	Meses					
	Jul	Ago	Set	Out	Nov	Dez
<b>Obs</b>						
<b>Hno</b>	353	335	332	331	342	350
<b>Hnp1</b>	421	363	<b>327</b>	340	406	525
<b>Dif (Obs-Hnp1)</b>						
<b>Acerto (%)</b>						



# Nível Fluviométrico Rio Tapajós (Barra de São Manoel-PA)



## Legenda:

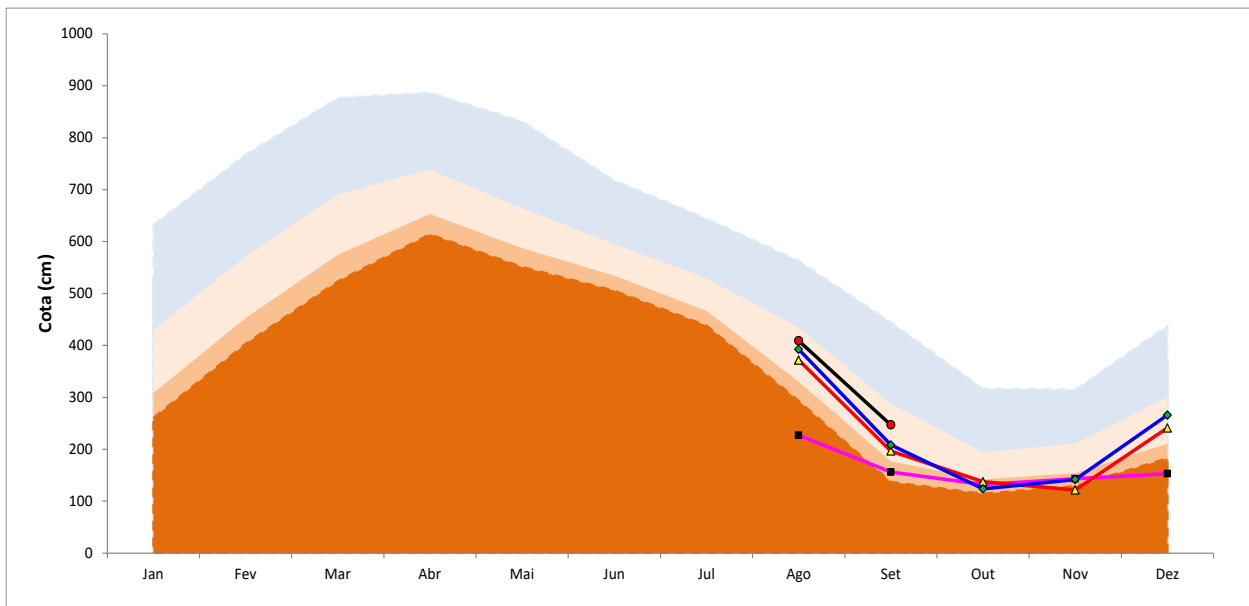
- Anomalia Fraca
- Normalidade
- Anomalia Negativa Fraca
- Anomalia Negativa Moderada
- Anomalia Negativa Severa
- Obs
- Hno
- ▲ Hmp1
- ◆ Hmp2

	Meses						
	Jun	Jul	Ago	Set	Out	Nov	Dez
<b>Obs</b>							
<b>Hno</b>	343	296	266	270	276	297	
<b>Hmp1</b>	465	373	252	<b>224</b>	257	389	
<b>Dif (Obs-Hmp1)</b>							
<b>Acerto (%)</b>							

# Nível Fluviométrico Rio Tapajós (Itaituba-PA)



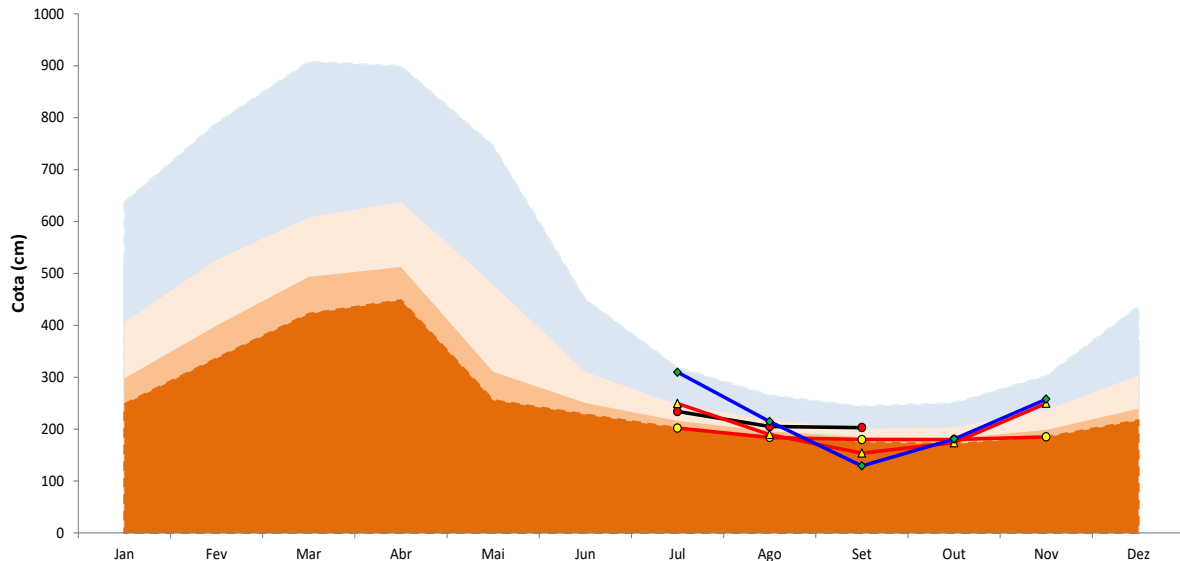
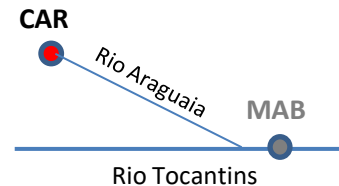
Prognóstico de Longo Prazo



- Legenda:**
- Anomalia Fraca
  - Normalidade
  - Anomalia Negativa Fraca
  - Anomalia Negativa Moderada
  - Anomalia Negativa Severa
  - Obs
  - Hno
  - ▲ Hmp1
  - ◆ Hmp2

	Meses				
	Ago	Set	Out	Nov	Dez
<b>Obs</b>	409.0	247.0			
<b>Hno</b>	227.0	156.0	132.0	143.0	153.0
<b>Hmp1</b>	371.7	196.7	137.4	<b>121.6</b>	241.0
<b>Hmp2</b>	392.3	208.3	<b>123.7</b>	141.9	265.8
<b>Dif (Obs-Hmp1)</b>	37.3	<b>50.3</b>			
<b>Dif (Obs-Hmp2)</b>	16.7	<b>38.7</b>			
<b>Acerto-p1 (%)</b>	90.9	<b>79.6</b>			
<b>Acerto-p2 (%)</b>	95.9	<b>84.3</b>			

# Nível Fluviométrico Rio Araguaia (Conceição do Araguaia-PA)



## Legenda:

- Anomalia Fraca
- Normalidade
- Anomalia Negativa Fraca
- Anomalia Negativa Moderada
- Anomalia Negativa Severa
- Obs
- Hno
- ▲ Hmp1
- ◆ Hmp2

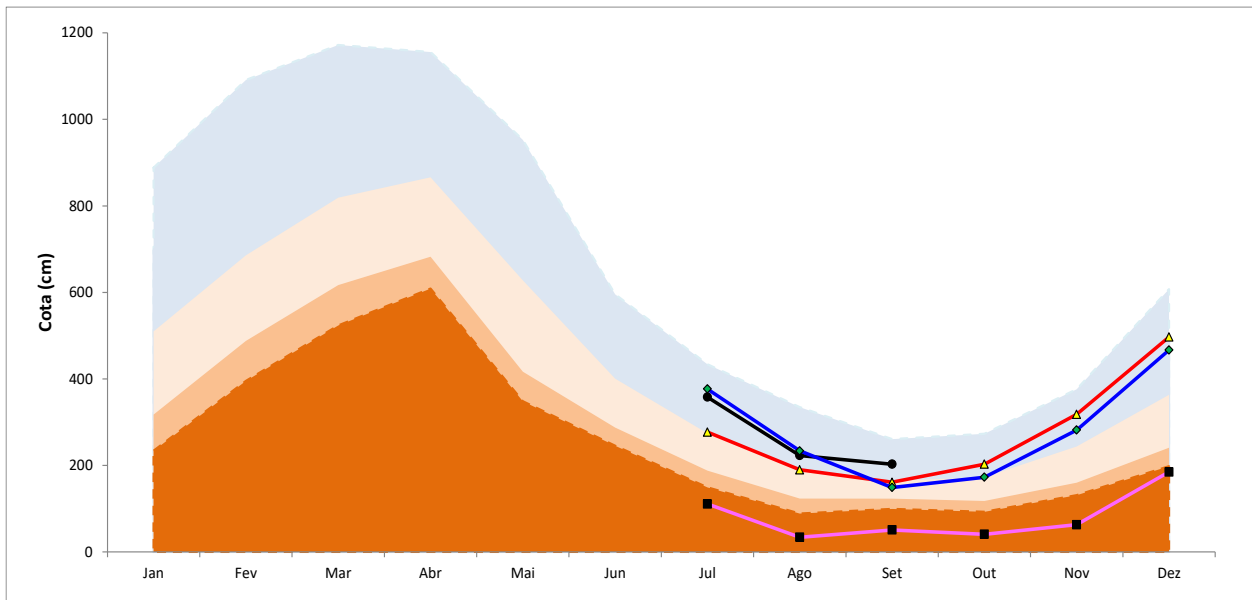
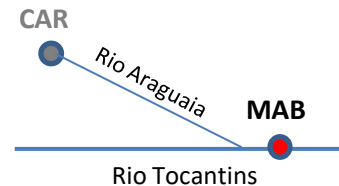
	Meses				
	Jul	Ago	Set	Out	Nov
<b>Obs</b>	234.0	205.0	203.0		
<b>Hno</b>	202.0	184.0	180.0	180.0	185.0
<b>Hmp1</b>	249.3	189.7	<b>153.8</b>	173.9	249.7
<b>Hmp2</b>	309.6	214.6	<b>129.2</b>	180.9	257.7
<b>Dif (Obs-Hmp1)</b>	-15.3	15.3	49.2		
<b>Dif (Obs-Hmp2)</b>	-75.6	-9.6	50.8		
<b>Acerto-p1 (%)</b>	93.5	92.5	75.8		
<b>Acerto-p2 (%)</b>	67.7	95.3	63.7		



# Nível Fluviométrico Rio Tocantins (Marabá-PA)



Prognóstico de Longo Prazo

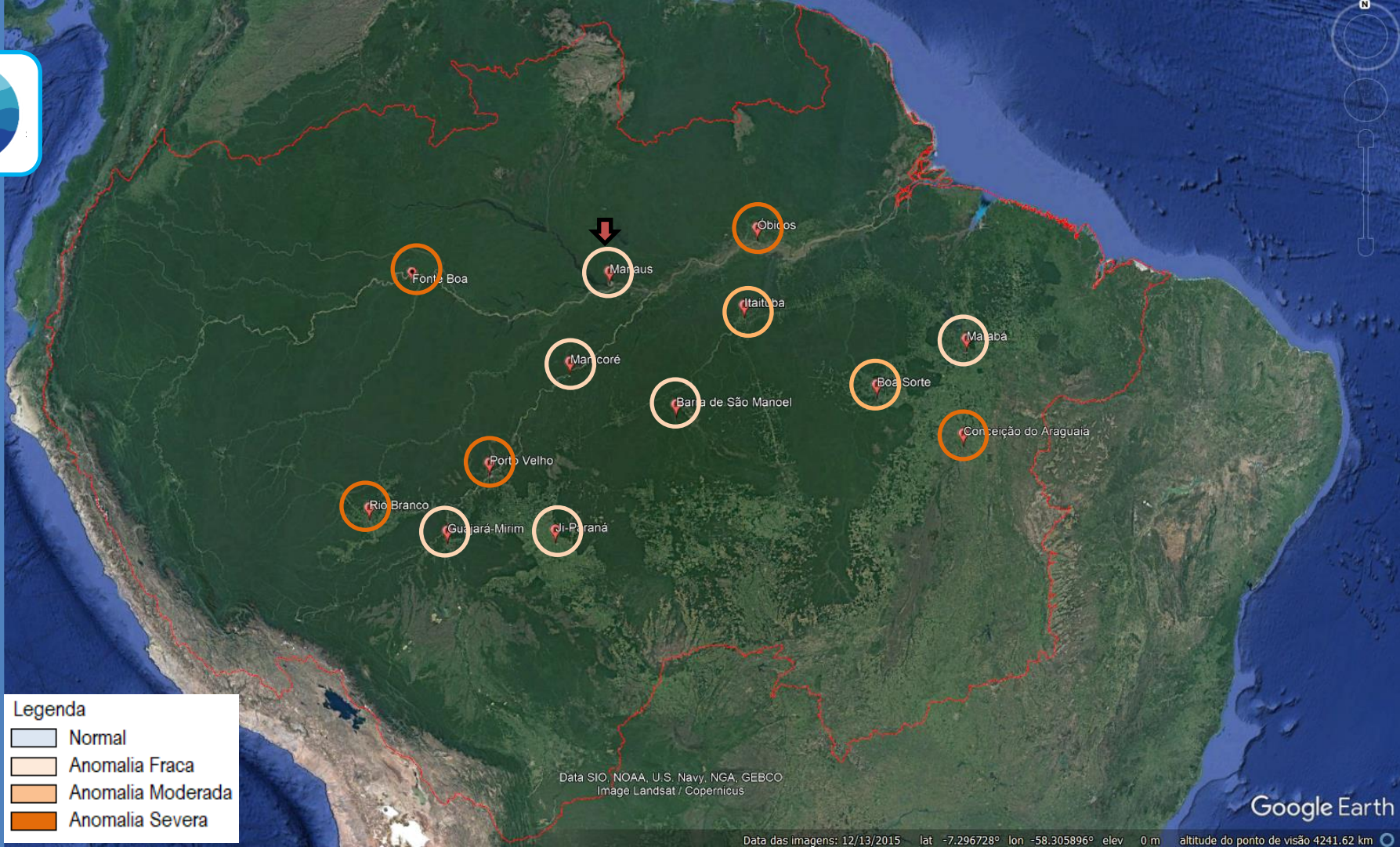


## Legenda:

- Anomalia Fraca
- Normalidade
- Anomalia Negativa Fraca
- Anomalia Negativa Moderada
- Anomalia Negativa Severa
- Obs
- Hno
- ▲ Hmp1
- ◆ Hmp2

	Meses					
	Jul	Ago	Set	Out	Nov	Dez
<b>Obs</b>	358.0	223.0	213.0			
<b>Hno</b>	111.0	34.0	51.0	41.0	63.0	185.0
<b>Hmp1</b>	277.0	190.0	<b>161.2</b>	203.0	318.2	496.9
<b>Hmp2</b>	376.8	233.7	<b>149.0</b>	172.9	282.0	466.6
<b>Dif (Obs-Hmp1)</b>	81.0	33.0	51.8			
<b>Dif (Obs-Hmp2)</b>	-18.8	-10.7	64.0			
<b>Acerto-p1 (%)</b>	77.4	85.2	75.7			
<b>Acerto-p2 (%)</b>	94.7	95.2	70.0			

# Prognóstico de Longo Prazo







# Obrigado!!!

## SipamHidro

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