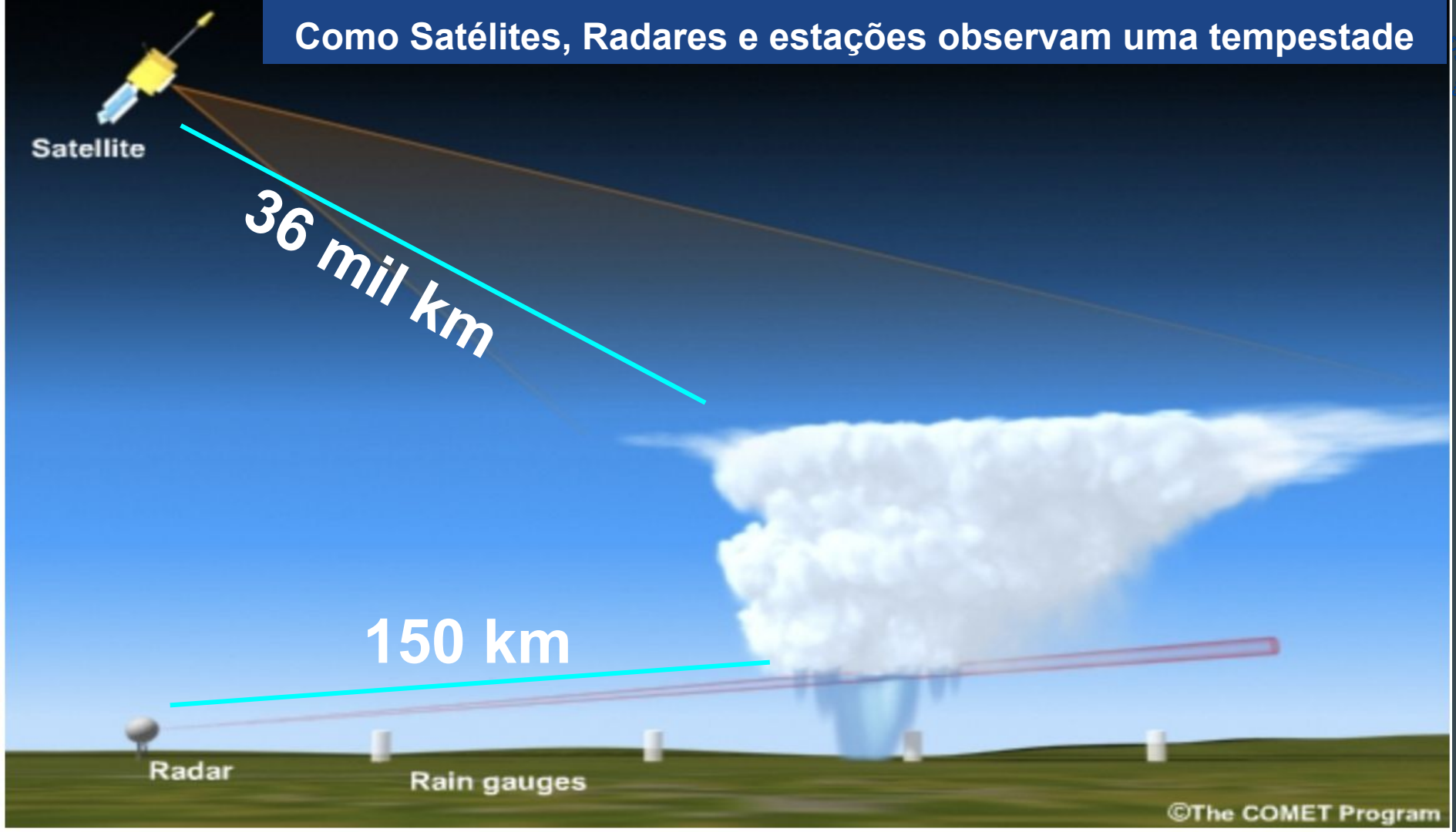
Radares Meteorológicos

Prof. Leonardo Calvetti

METEOROLOGIA - UFPEL


Como Satélites, Radares e estações observam uma tempestade
Satellite
36 mil km
150 km
Radar
Rain gauges
©The COMET Program

Radar opera na frequência do microondas

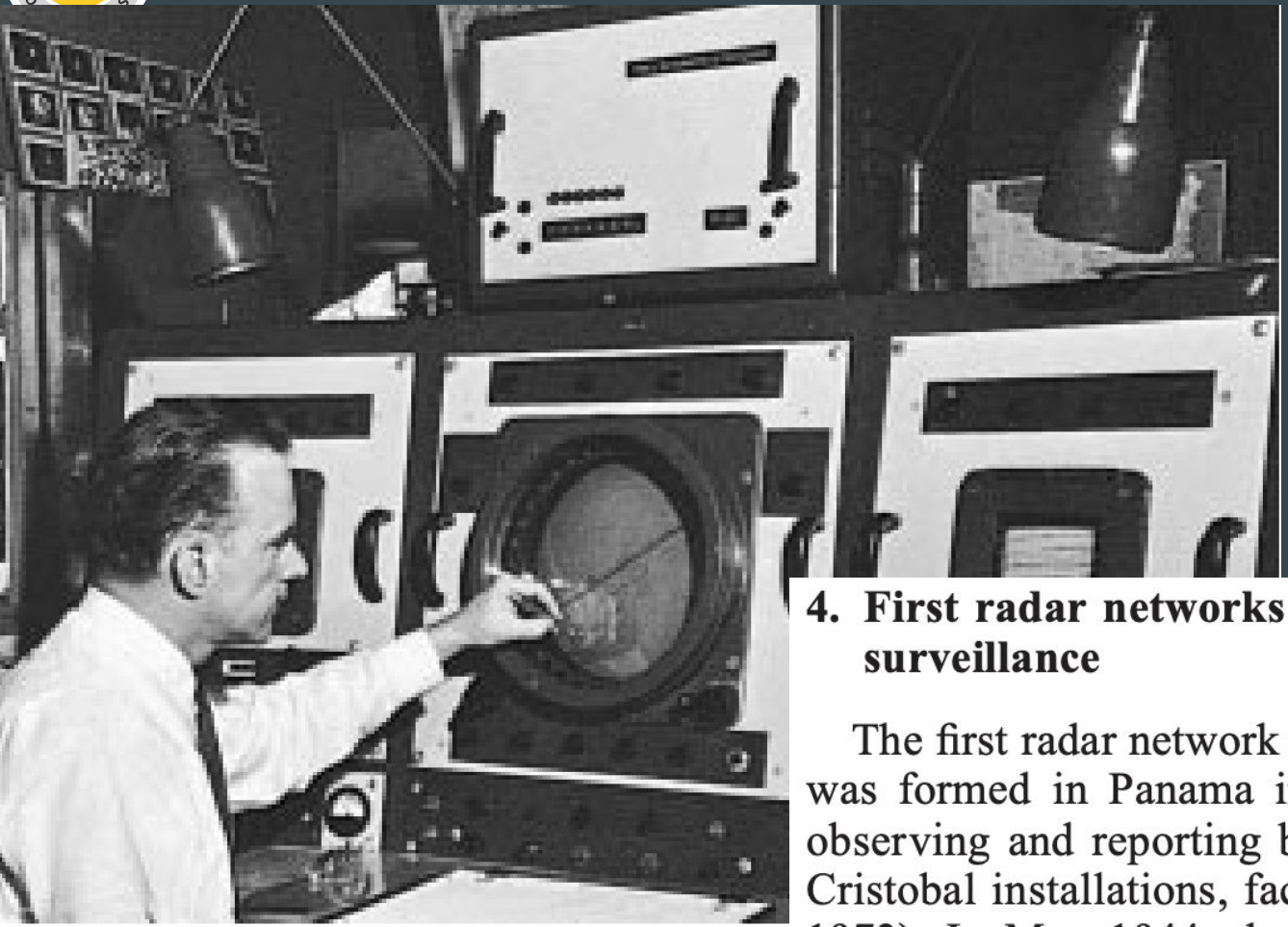
S 2,8 GHz λ = 10.7 cm (UFPEL)

C 5,6 GHz λ = 5,3 cm

X 9,3 GHz λ = 2,2 cm

Beginning in July 1940, a radar of 10-cm wavelength was operated at the General Electric Corporation Research Laboratory in Wembley, England, where Dr. J. W. Ryde worked (Doviak and Zrnić 1993). It is likely that the first weather echo was seen on this radar or another like it in England, probably in late 1940 or possibly as late as February 1941. Perhaps to explain

Whiton et al.,WAF 1998



WSR 57

Primeiro radar meteorológico.

4. First radar networks used for weather surveillance

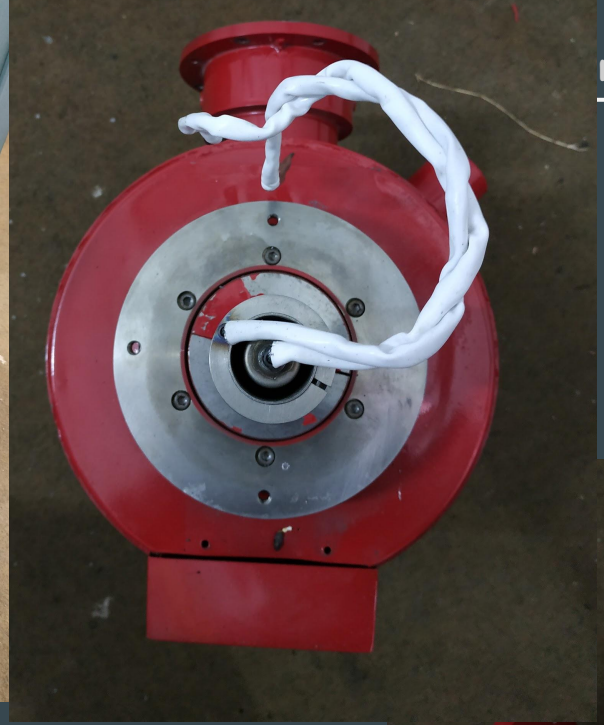
The first radar network used for weather surveillance was formed in Panama in April 1944, when weather observing and reporting began at two Harbor Defense Cristobal installations, facing the Atlantic Ocean (Best

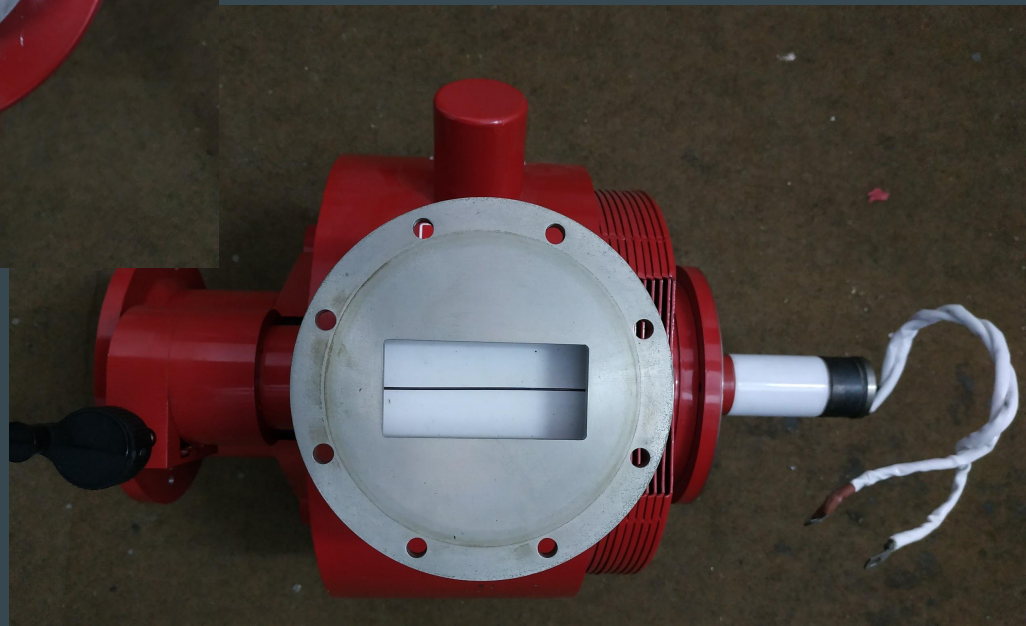
A antena do radar é colocada sobre uma torre de concreto ou metálica e protegida sobre uma radome de fibra de vidro.

Radares Meteorológicos


CAUTION

Magnetron





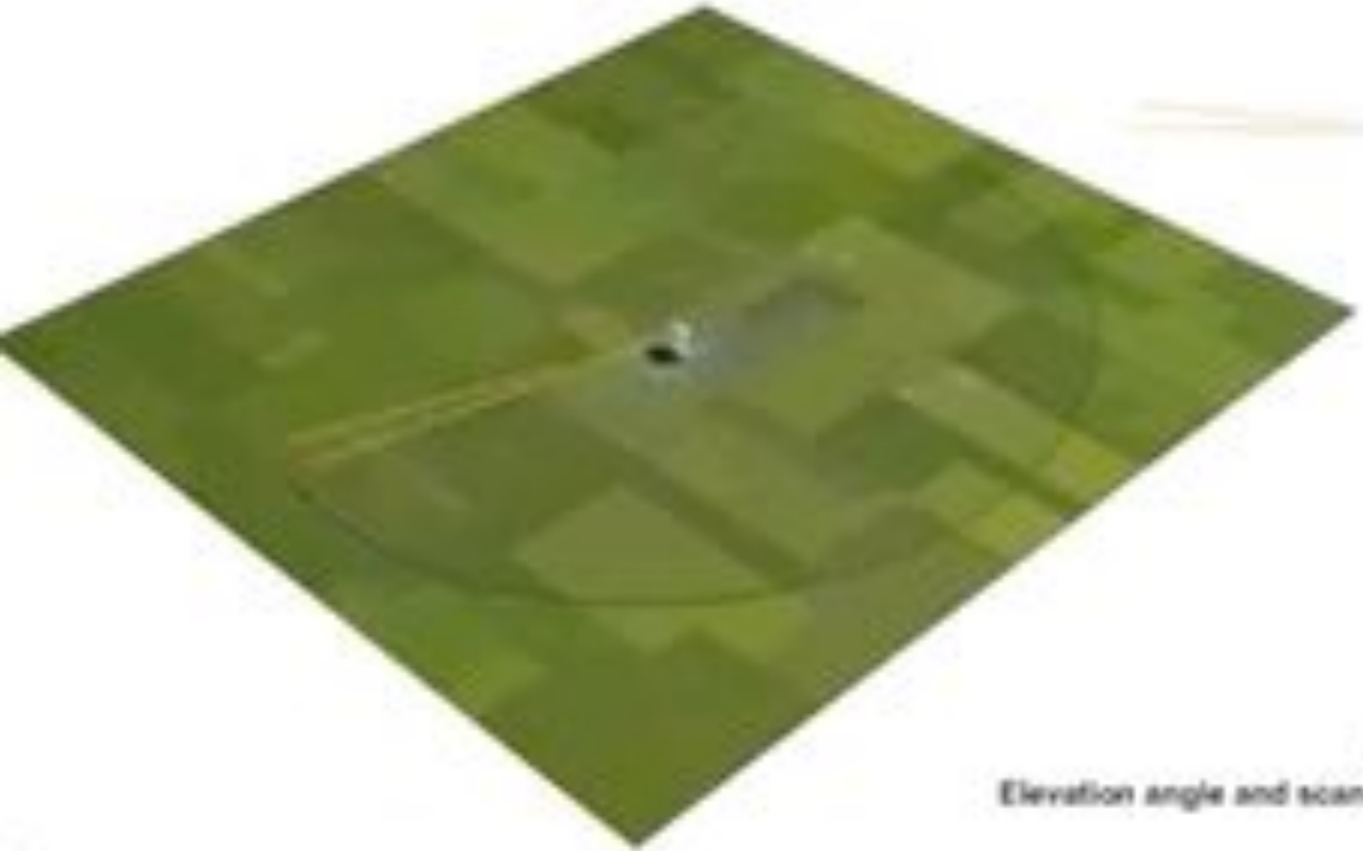

CATHODE
H.V. OUTPUT
HEATER
RELIEF VALVE
GND
DANGER
HIGH VOLTAGE
VAISALA


FILAMENT PWR
PGM
FIL
PW ADJUST
0.5
0.8
1.0
2.0
RESET
INT
EXT
POWER ADJUST


DANGER
HIGH VOLTAGE
2A
2A
20A
20A
F1
F2
F3
F4
J1
PRF IN
J2
PRF OUT
VAISALA SOLID STATE TRANSMITTER
PS-2052 (TR-1157)
VAISALA
J3
MOD PWR
J4
CONTROL CONN



Radar Scanning Pattern



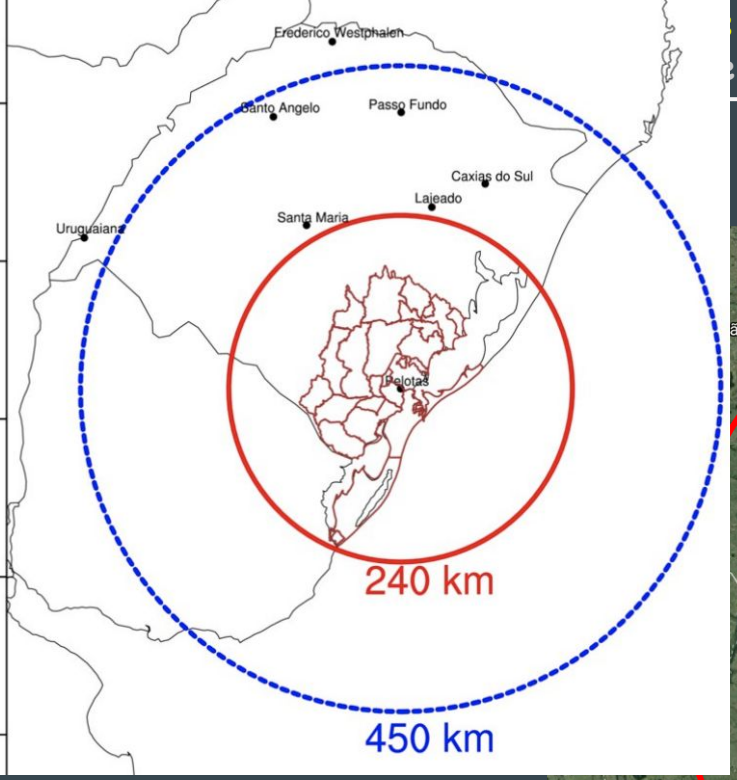
0.5°

Scan angle

Footnote:
Elevation angle and scanning speed increased to show detail

Meteorológicos

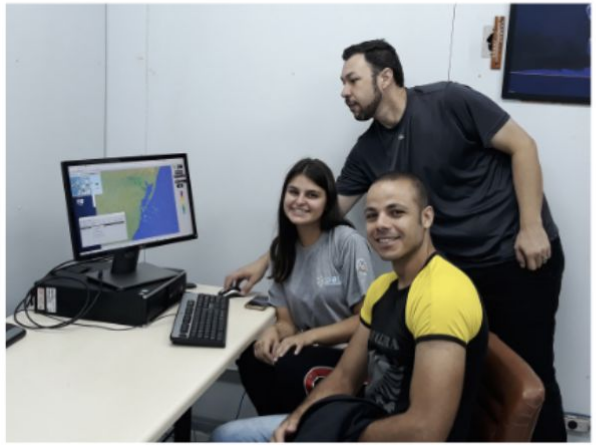
uso de informações meteorológicas

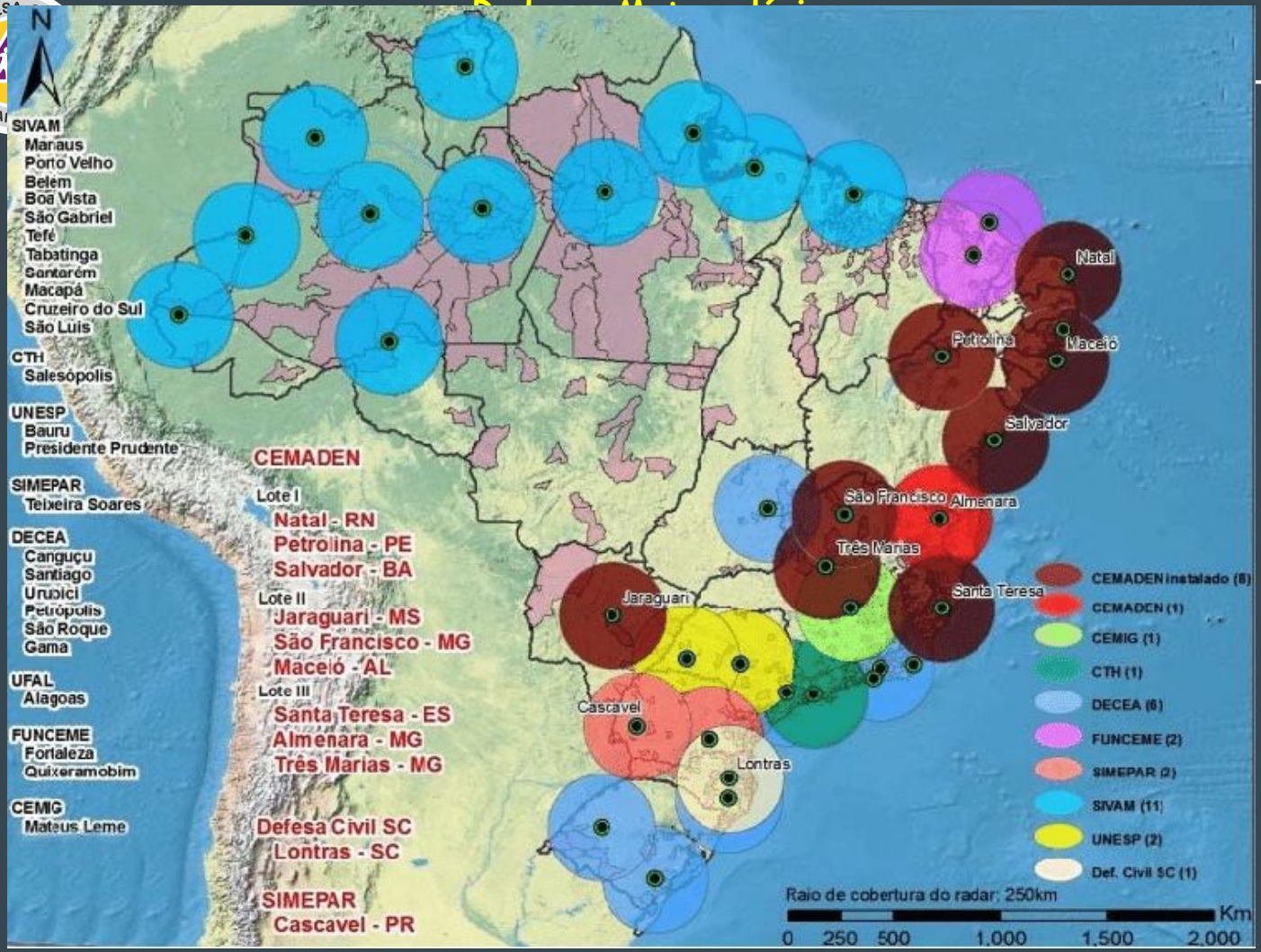


Radar Meteorológico UFPEL

Unidade 8: Alvos Meteorológicos

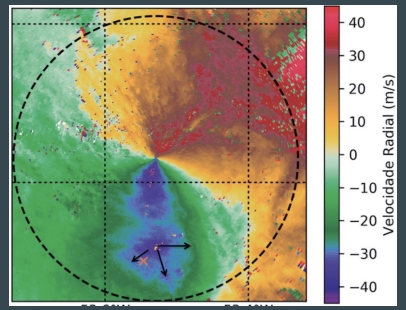
Prática: Configuração do Radar da UFPEL: Aprendizagem ativa com PBL (*Problem-Based Learning*)

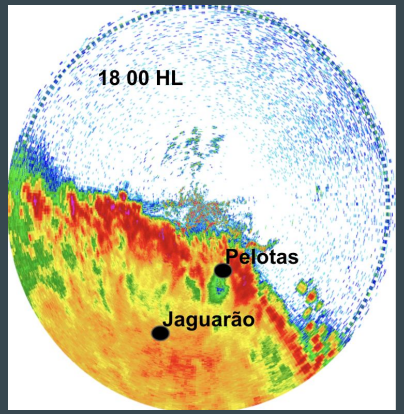



N
SIVAM
Manaus
Porto Velho
Belem
Boa Vista
São Gabriel
Tefé
Tabatinga
Santarém
Macapá
Cruzeiro do Sul
São Luis
CTH
Salesópolis
UNESP
Bauru
Presidente Prudente
SIMEPAR
Teixeira Soares
DECEA
Canguçu
Santiago
Urubici
Petrópolis
São Roque
Gama
UFAL
Alagoas
FUNCEME
Fortaleza
Quixeramobim
CEMIG
Mateus Leme
CEMADEN
Lote I
Natal - RN
Petrolina - PE
Salvador - BA
Lote II
Jaraguari - MS
São Francisco - MG
Maceió - AL
Lote III
Santa Teresa - ES
Almenara - MG
Três Marias - MG
Defesa Civil SC
Lontras - SC
SIMEPAR
Cascavel - PR
Natal
Petrolina
Maceió
Salvador
São Francisco
Almenara
Três Marias
Santa Teresa
Jaraguari
Cascavel
Lontras
CEMADEN instalado (6)
CEMADEN (1)
CEMIG (1)
CTH (1)
DECEA (6)
FUNCEME (2)
SIMEPAR (2)
SIVAM (11)
UNESP (2)
Def. Civil SC (1)
Raio de cobertura do radar: 250km
Km
0 250 500 1.000 1.500 2.000

APLICAÇÕES

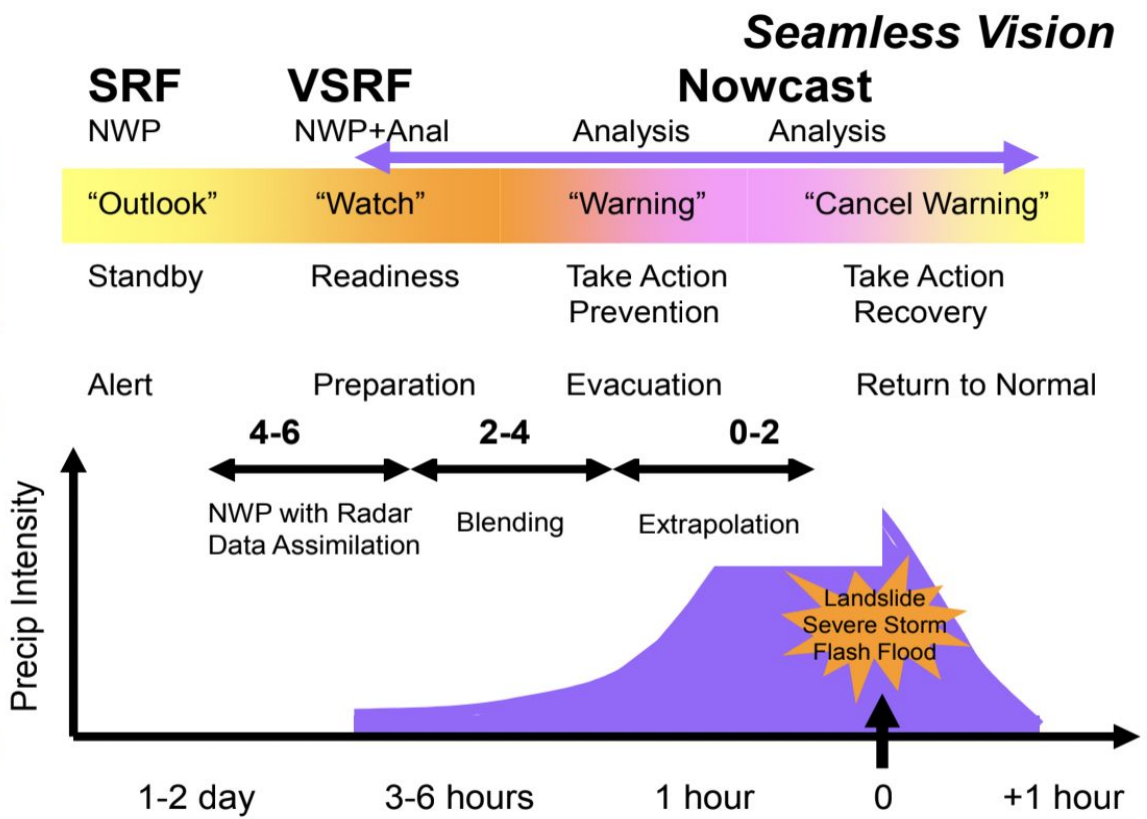
ASSINATURAS E ALERTAS





Nowcasting usa essencialmente:

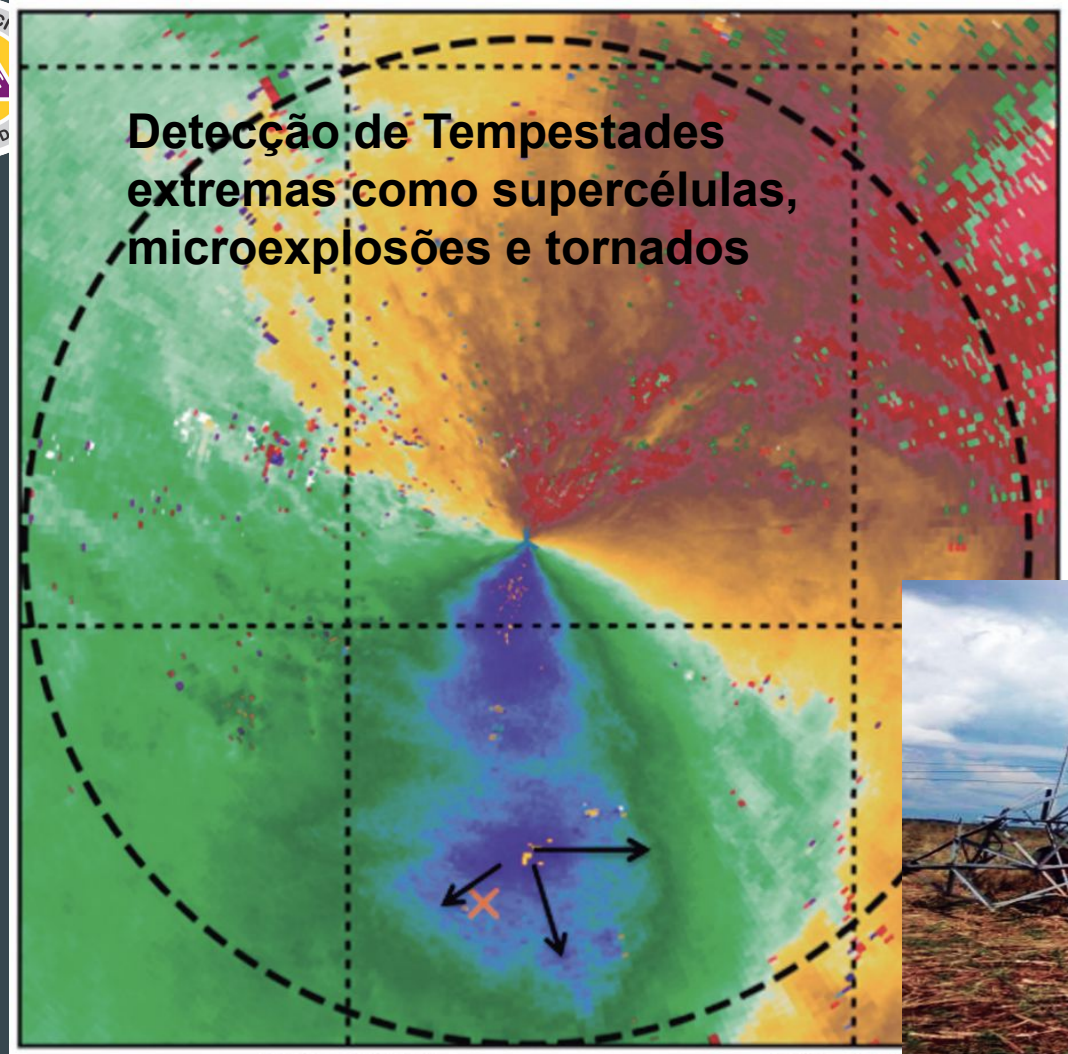
- **Radar**
- **Satélite**
- **Raios**

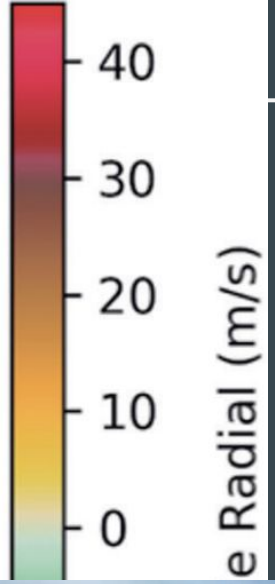


Shingo Yamada, JMA

Prof. Calvetti

Detecção de Tempestades extremas como supercélulas, microexplosões e tornados



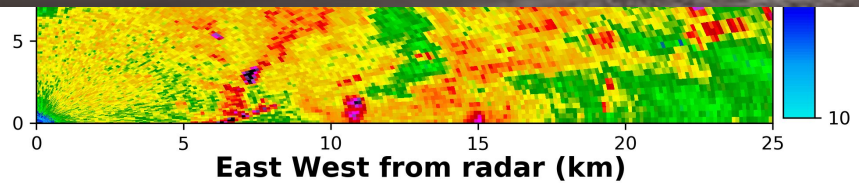


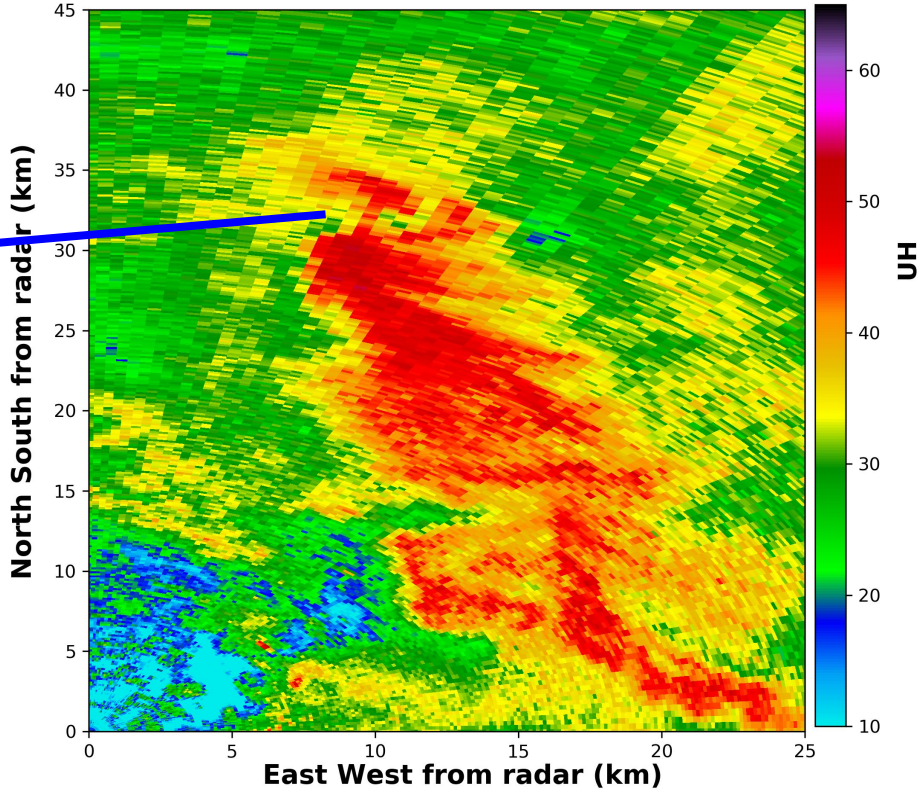
Microexplosão 13/10/2016 Calvetti et al 2017

2015/10/9 17:15 UTC elev0

2015/10/9 17:22 UTC elev1

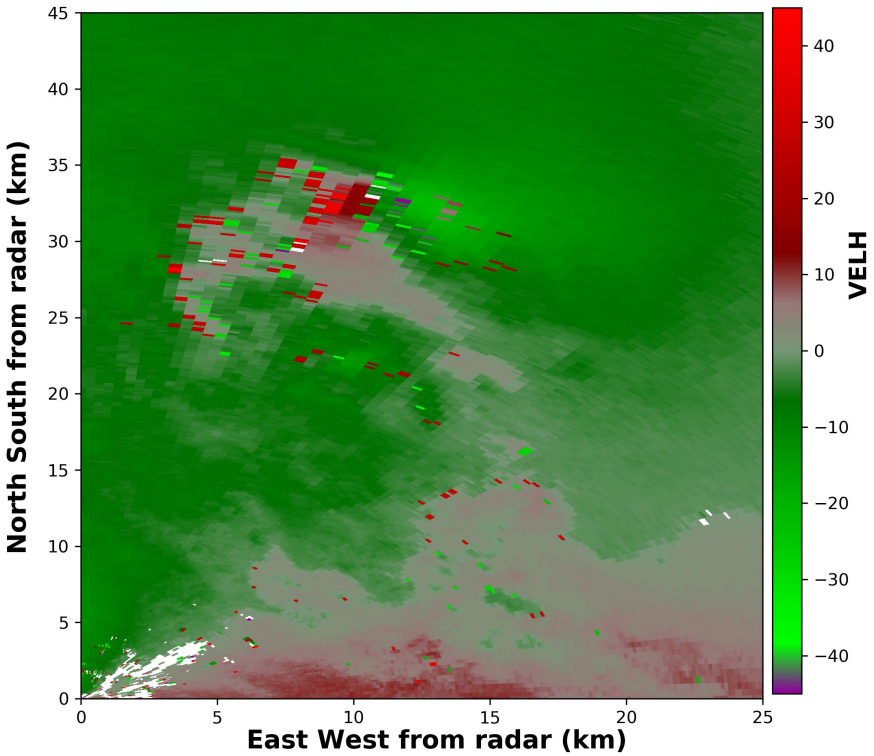
Tornado de Nova Aurora 09 Oct 2015c

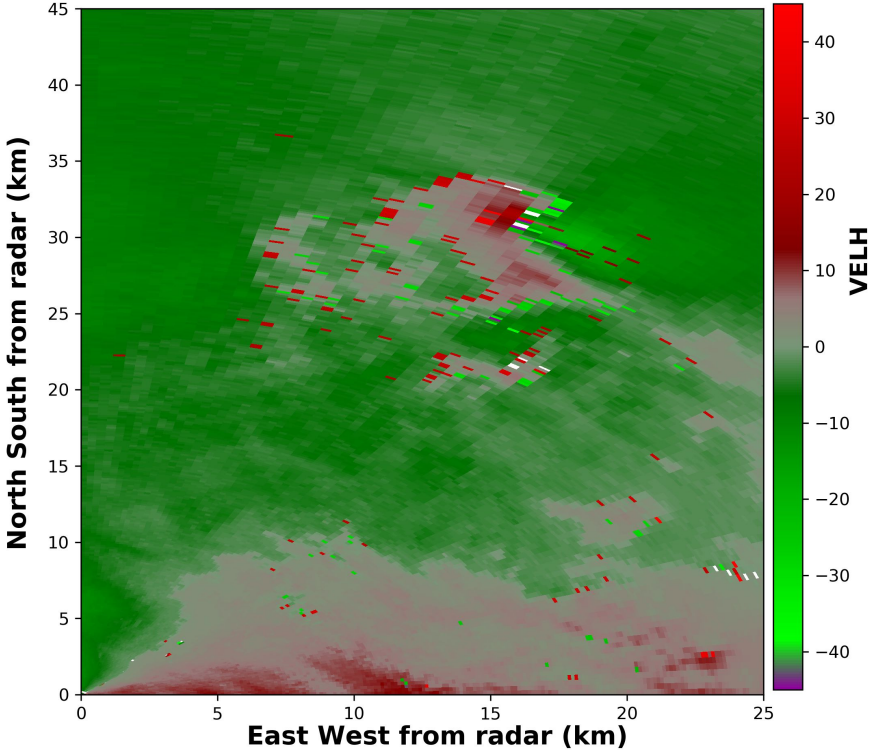




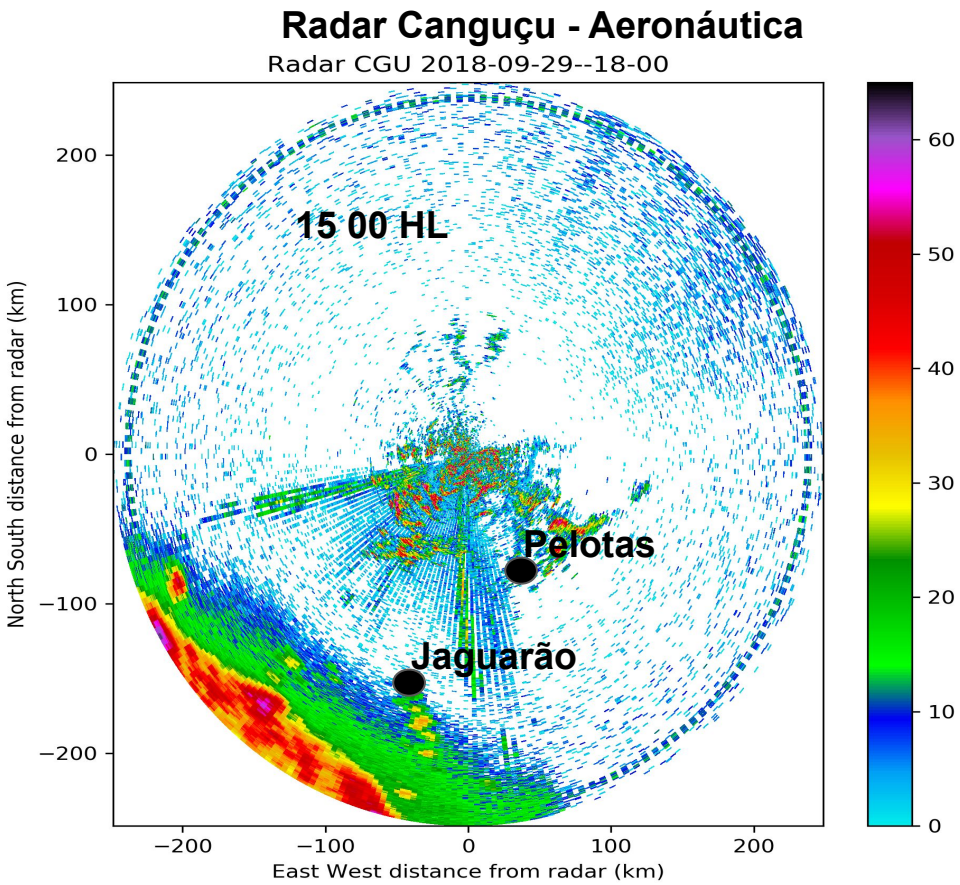
O diagnóstico é como um médico analisando um raio - X

Tornado de Nova Aurora 09 Oct 2015c





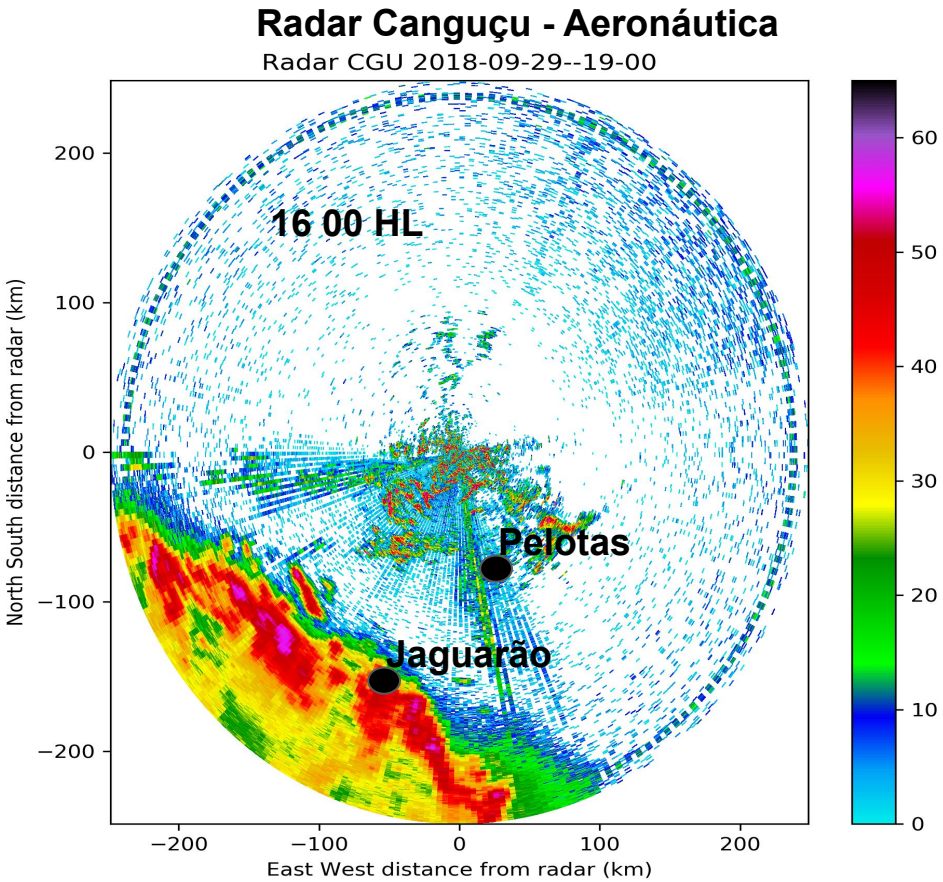
O sinal de radar para um tornado EF 1 é difícil e só ocorre para uma distância de até 60 km.



Tempestade de 29/11/2018

Linha de Instabilidade

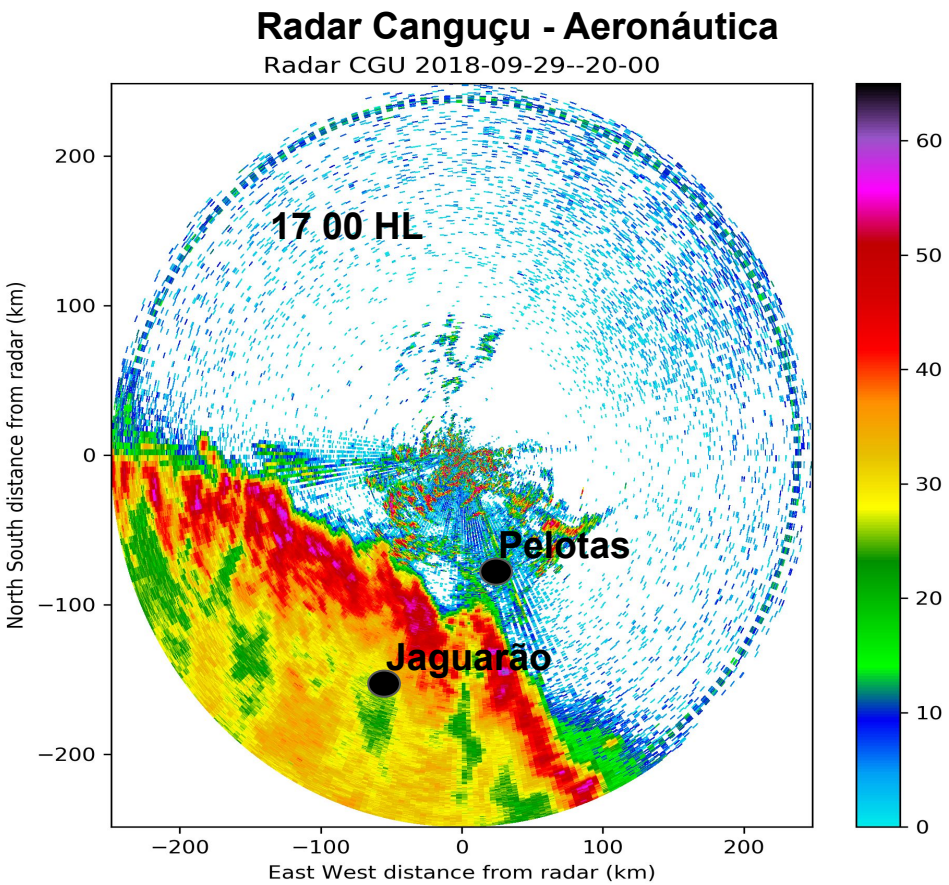
Entrando na cobertura quantitativa do Radar de Canguçu- Aeronáutica



Tempestade de 29/11/2018

Linha de Instabilidade

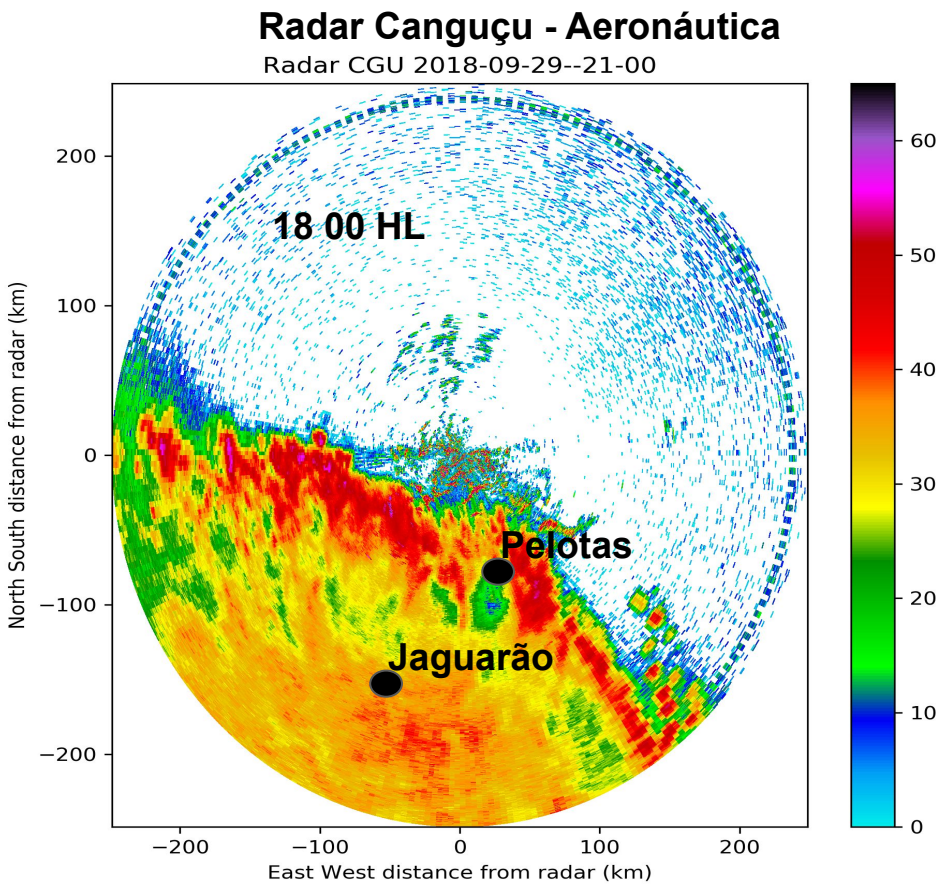
Chega a Jaguarão



Tempestade de 29/11/2018

Linha de Instabilidade

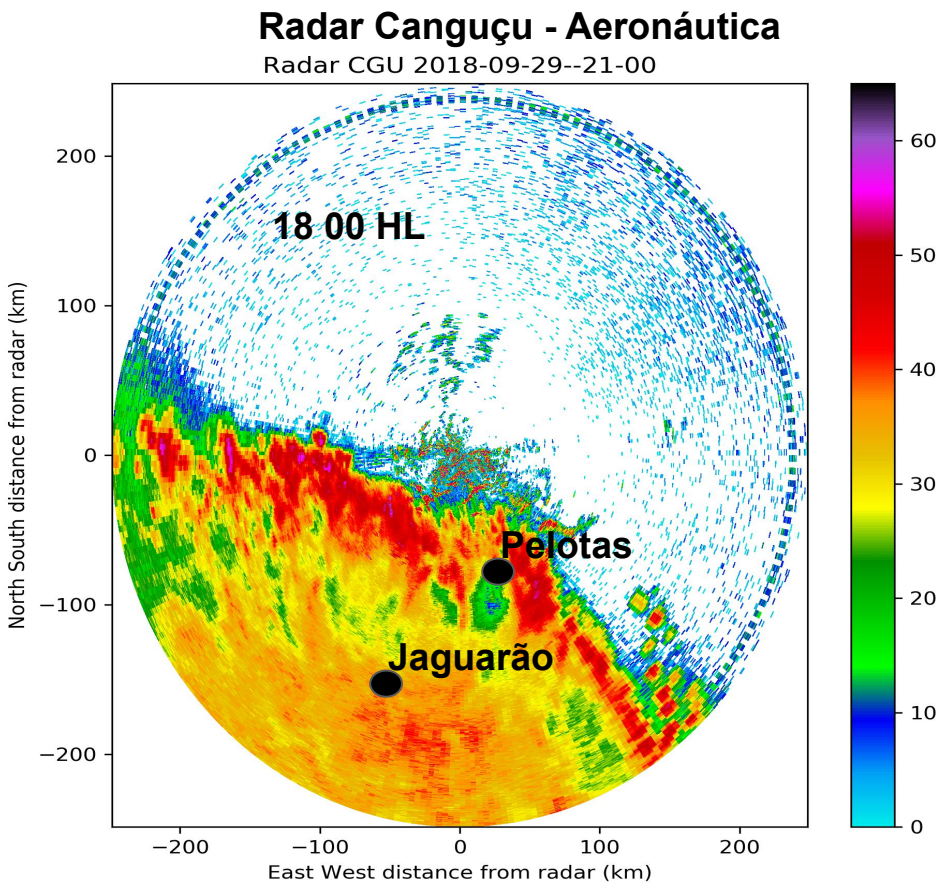
Chega a Arroio Grande, Herval, Pedro Osório, Pinheiro Machado, Aceguá



Tempestade de 29/11/2018

Linha de Instabilidade

Chega a Piratini, Capão do Leão, Pelotas, Rio Grande, Turuçu, Arroio do Padre, São Lourenço (30 min +)

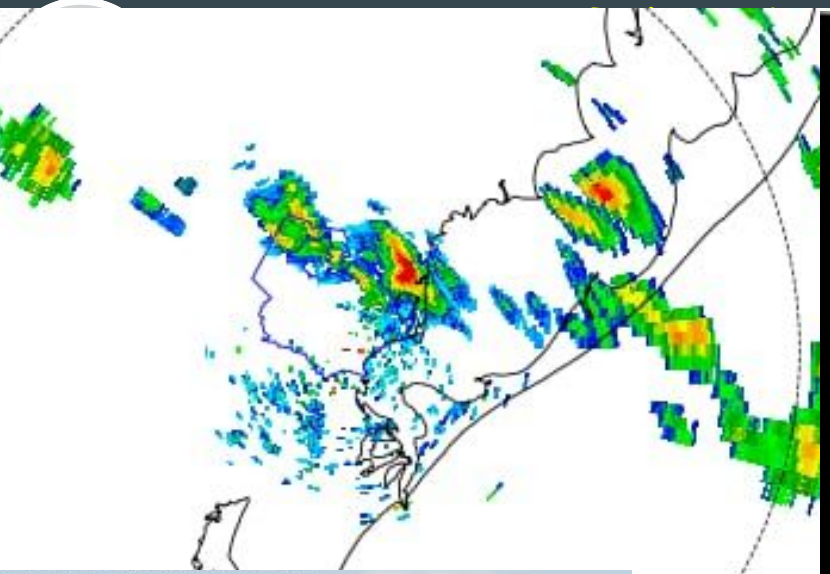


Tempestade de 29/11/2018

Linha de Instabilidade

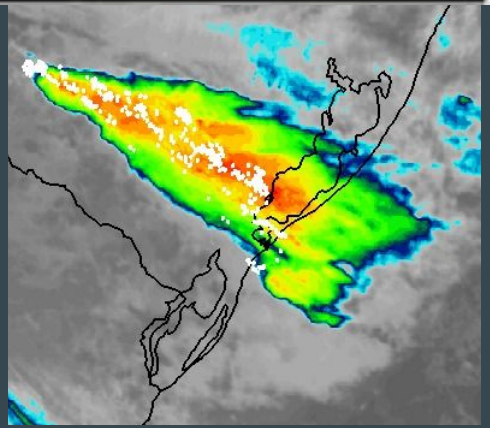
Chega a Piratini, Capão do Leão, Pelotas, Rio Grande, Turuçu, Arroio do Padre

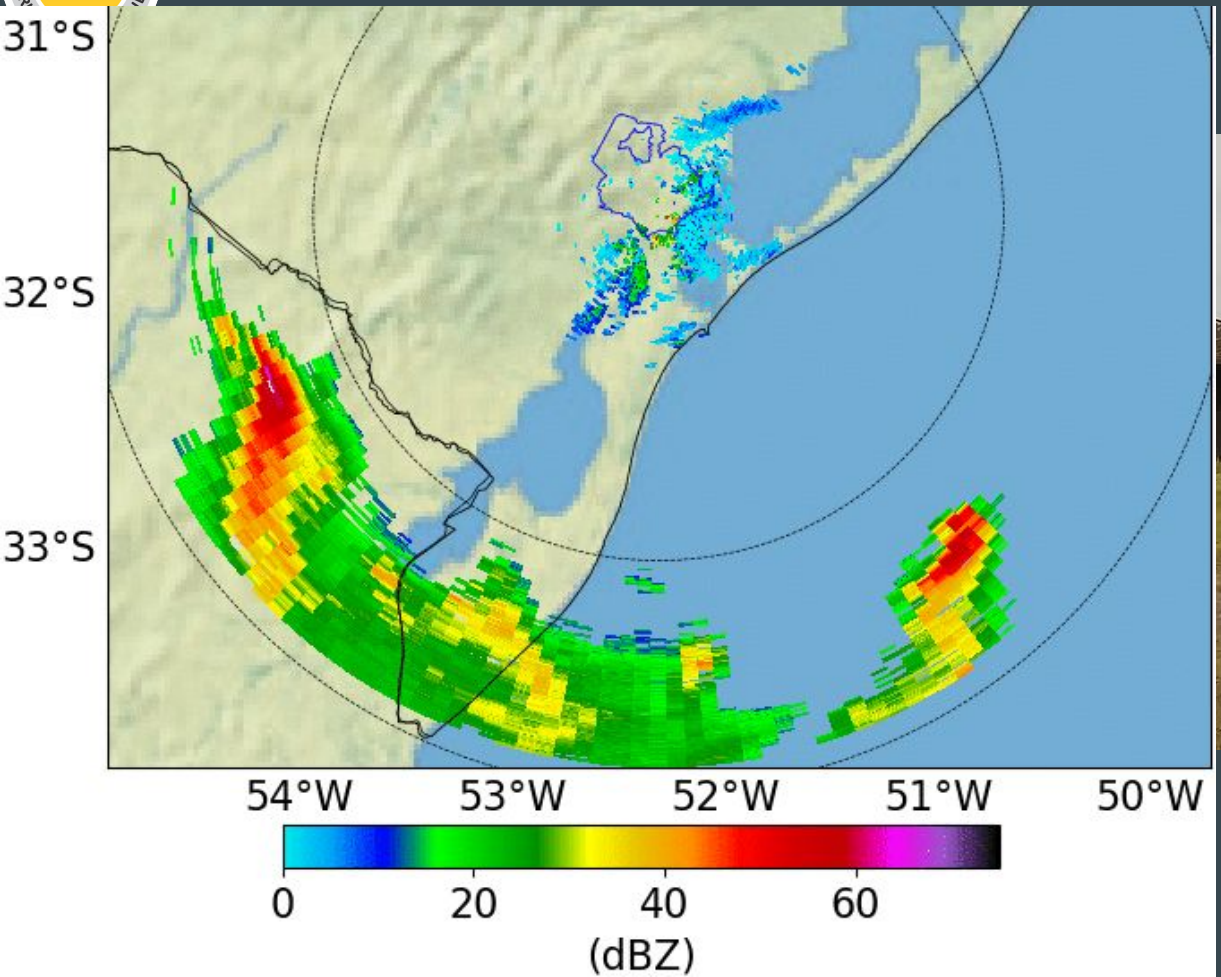
110 km/h



Registrado granizo na localidade Colônia Cerrito, em Arroio do Padre

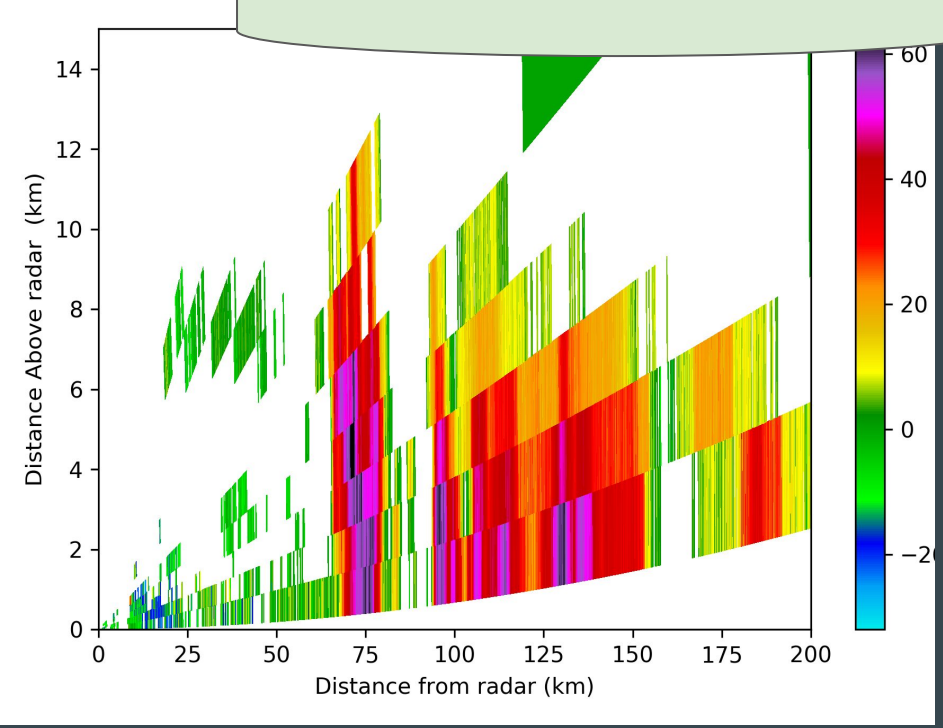
Descargas elétricas.
Radar, satélite e raios
12 agosto 2019



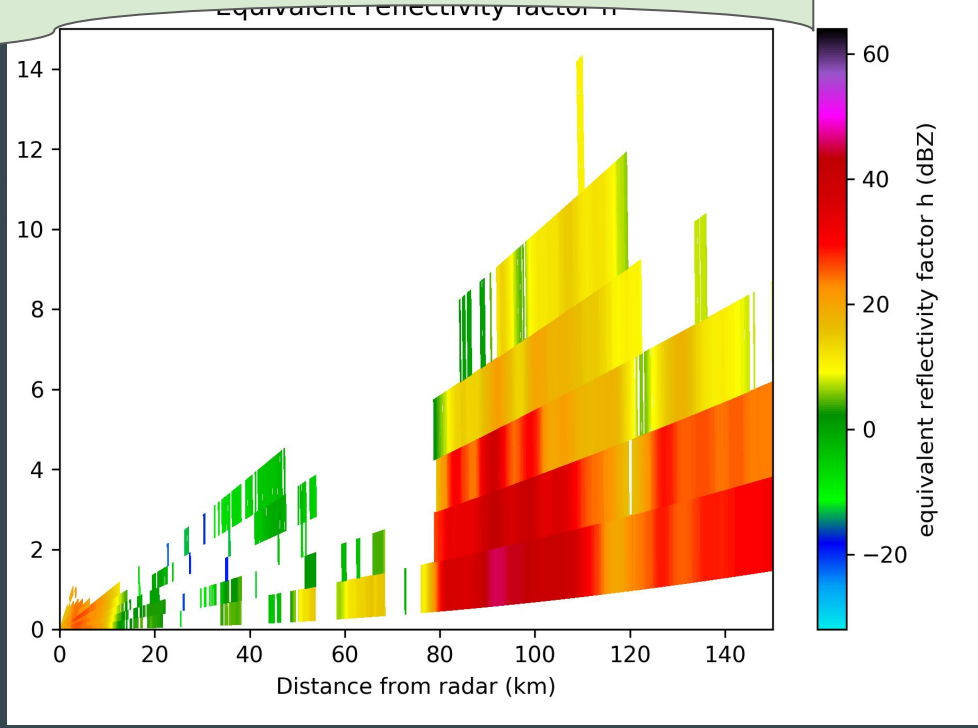

31°S
32°S
33°S
54°W
53°W
52°W
51°W
50°W
0
20
40
60
(dBZ)


9 sep. 2019 09:21:13
Ruta 8
Melo
Departamento de Cerro Largo

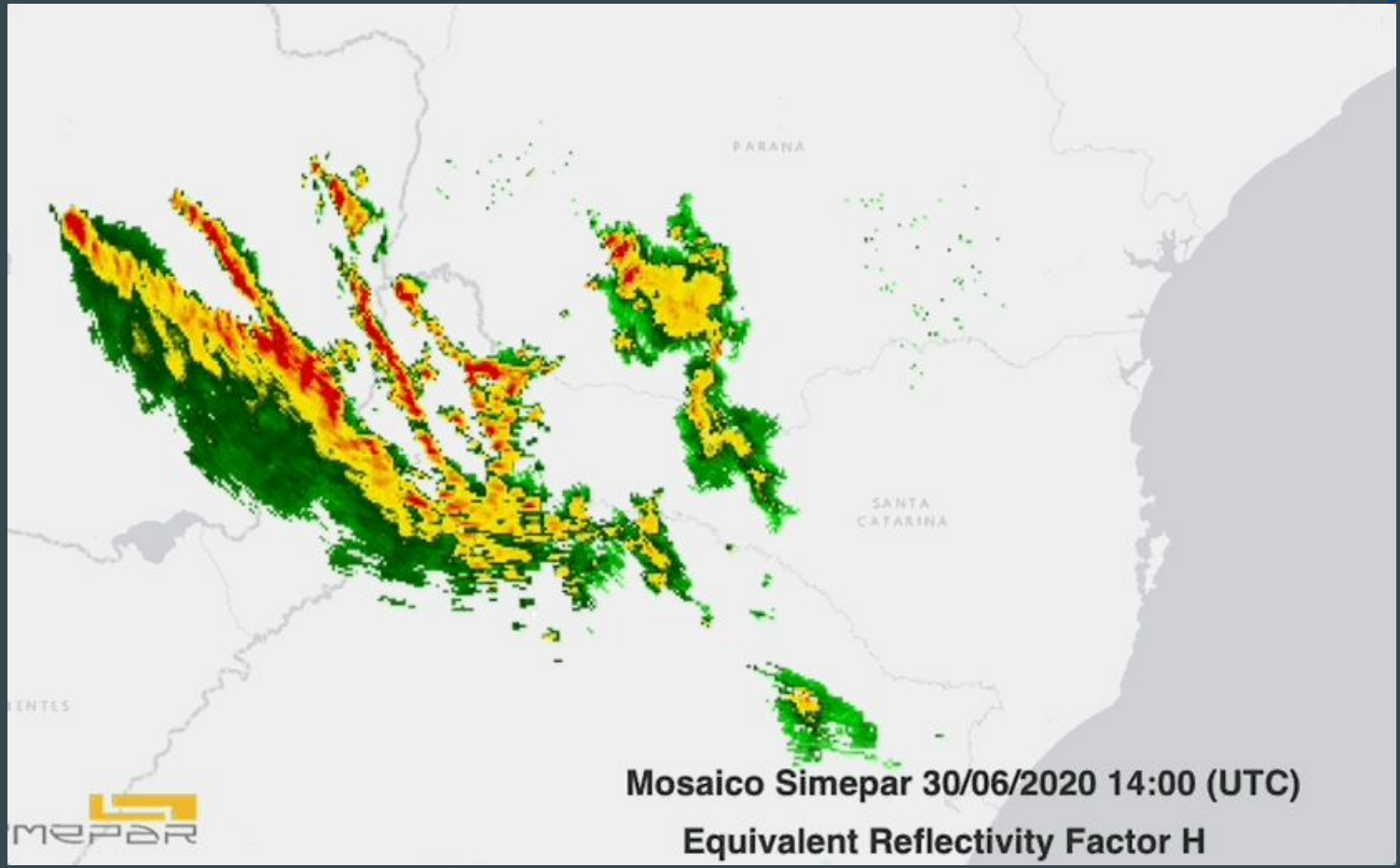
Desafio no Brasil. Grandes inundações podem ser geradas por convecção profunda (esquerda) ou rasa (direita).



Tempestade no Oeste do Brasil



Tempestade Leste do Brasil

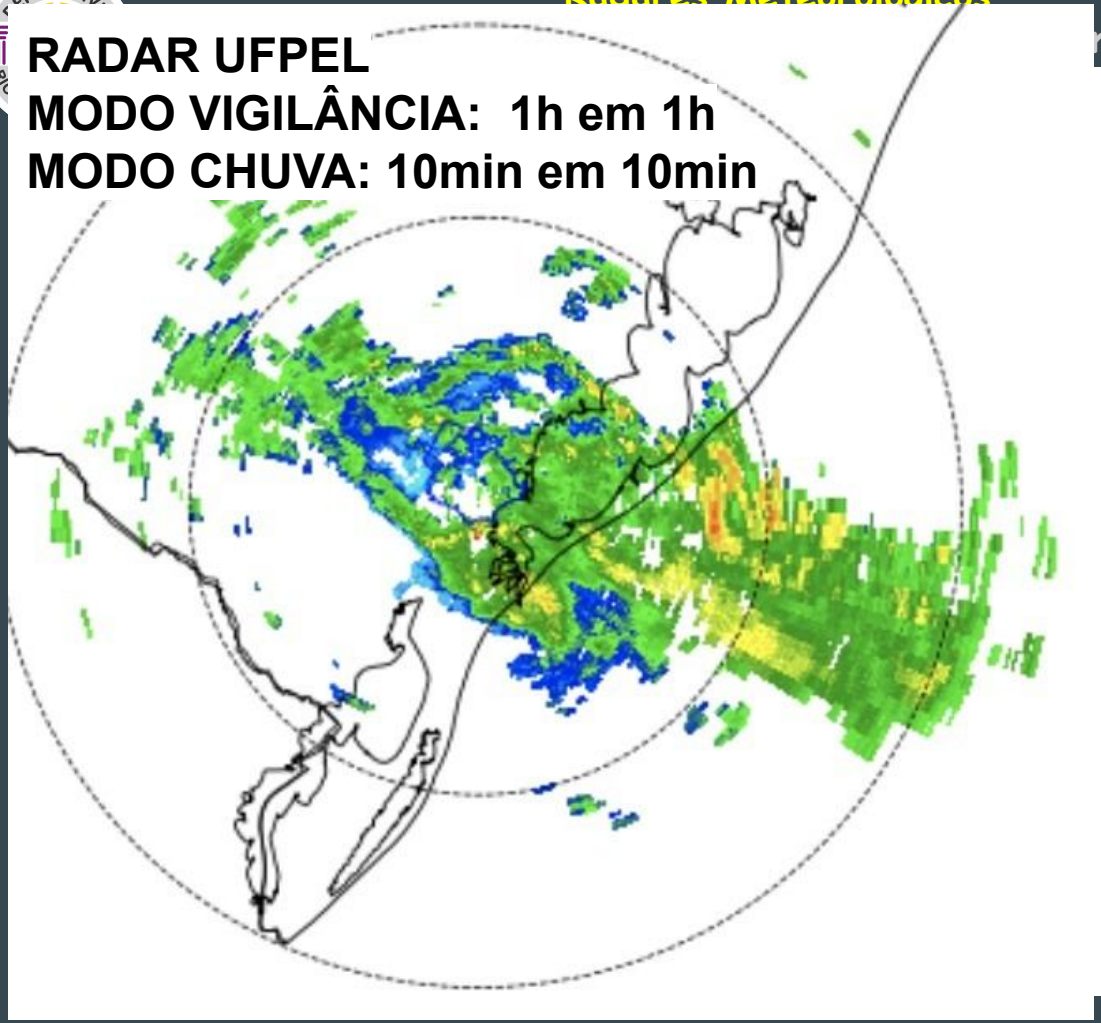

PARANA
SANTA CATARINA
Mosaico Simepar 30/06/2020 14:00 (UTC)
Equivalent Reflectivity Factor H

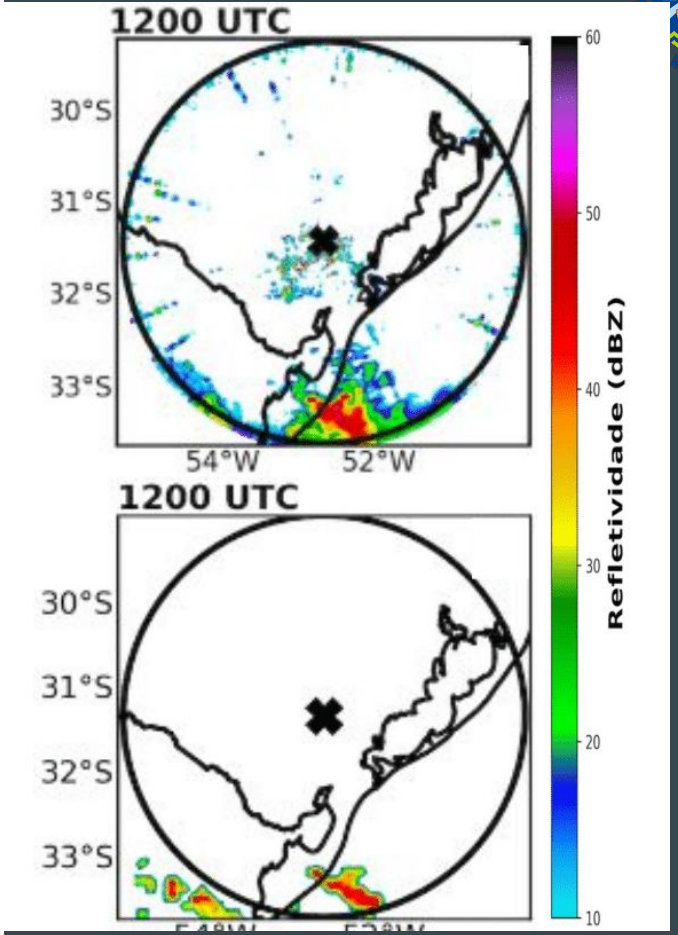
CPMET
NOVOS PRODUTOS

R2O = Research to Operational

A pesquisa realizada na universidade é aplicada no Centro Operacional (site) mediante desenvolvimento, ão e interação com a comunidade.

RADAR UFPEL
MODO VIGILÂNCIA: 1h em 1h
MODO CHUVA: 10min em 10min





Novo prédio Meteorologia UFPEL

2 computadores servidores

1 meteorologista
Concurso andamento

Peças radar Aguardando liberação importação

Muito grato pela atenção.

METEOROLOGIA - UFPEL