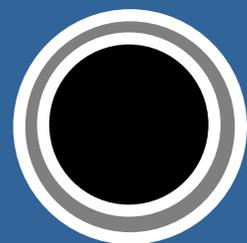


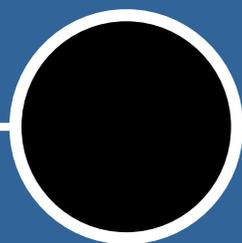


o presente e o futuro da
**hidreletricidade no
Brasil**

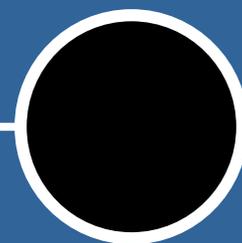
xxiii sbrh | danieldetzel



passado



presente



futuro

POWER

SOUTH

APP

DECE

CANAMBRA ENGINEER

**POWER STUDY
OF
SOUTH BRAZIL**

APPENDICES XIII - XIV

JANUARY 1969

CANAMBRA ENGINEERING CONSULTANTS LIMITED

STUDY

BRAZIL

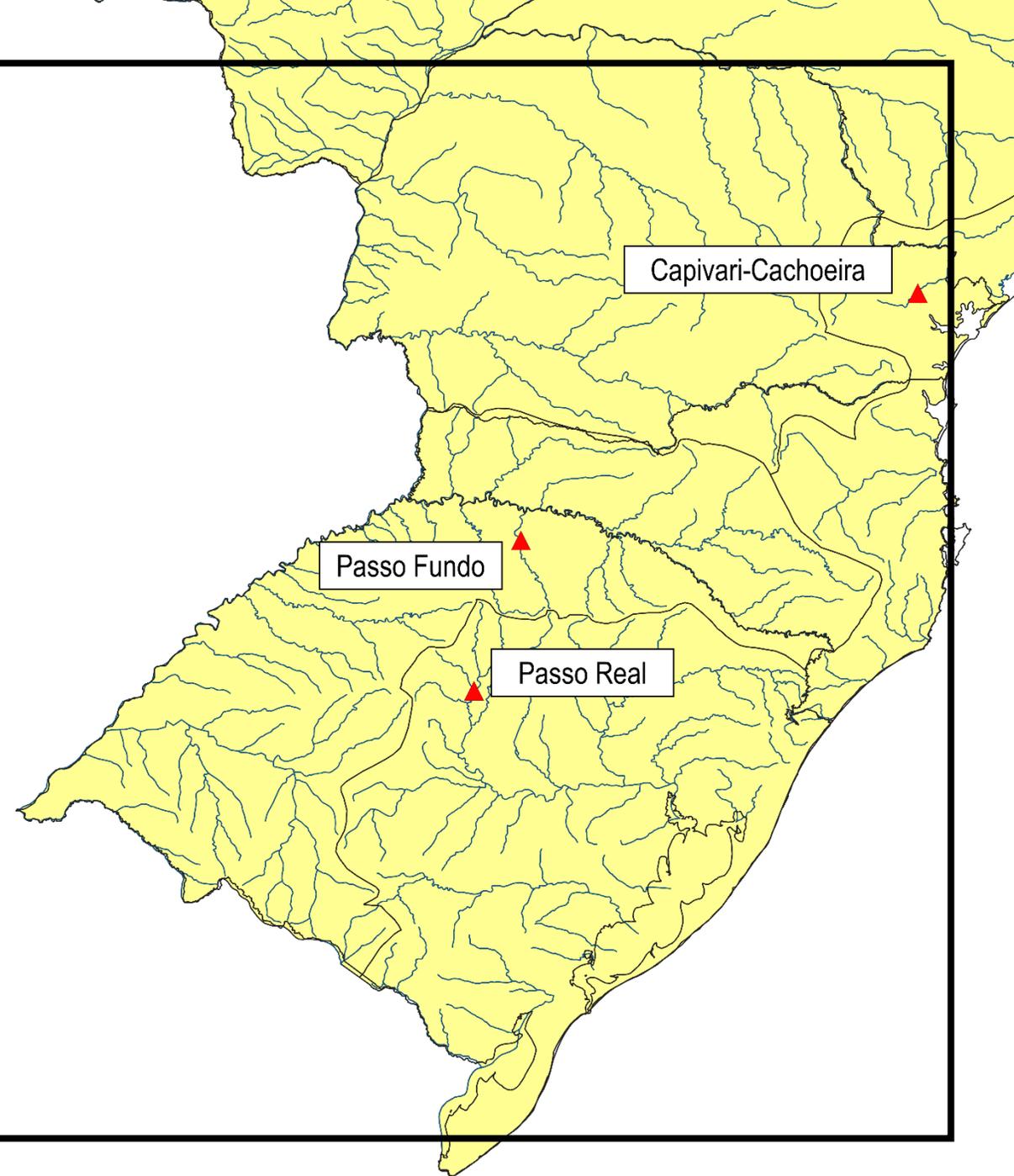
C VIII

1968

CONSULTANTS LIMITED

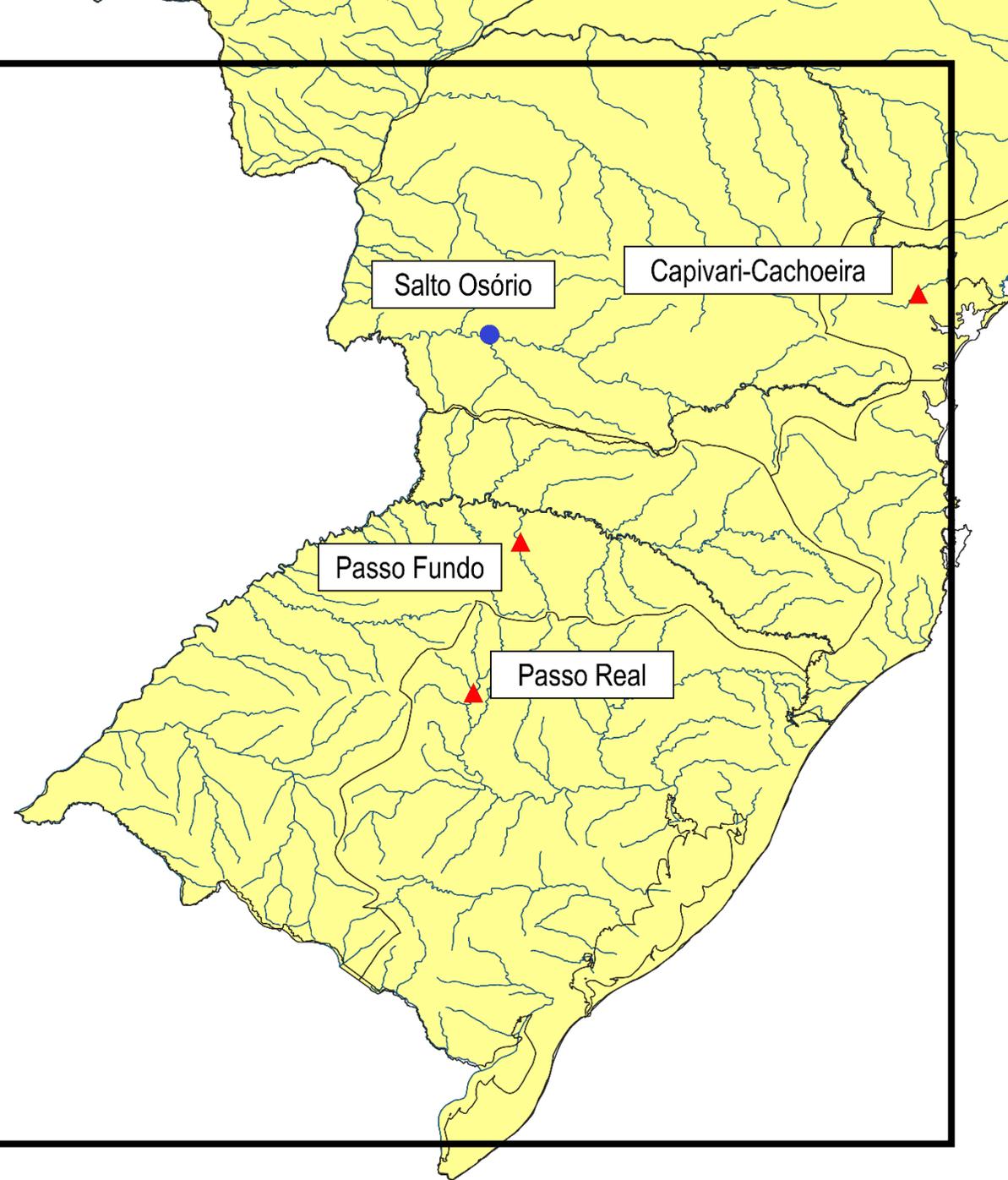
1968 – 1973

UHEs em construção



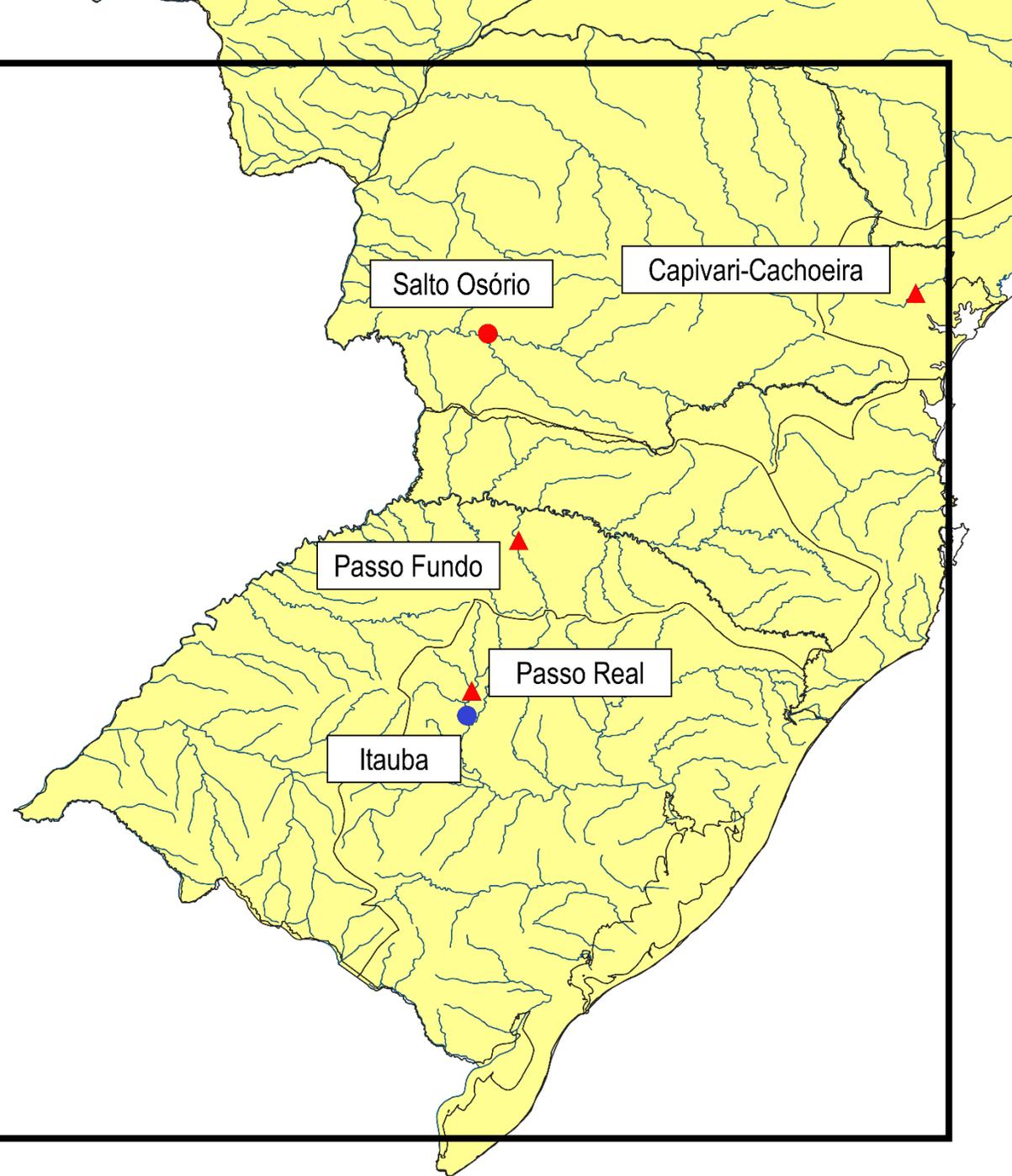
1974 – 1975

Suprimento até 1978



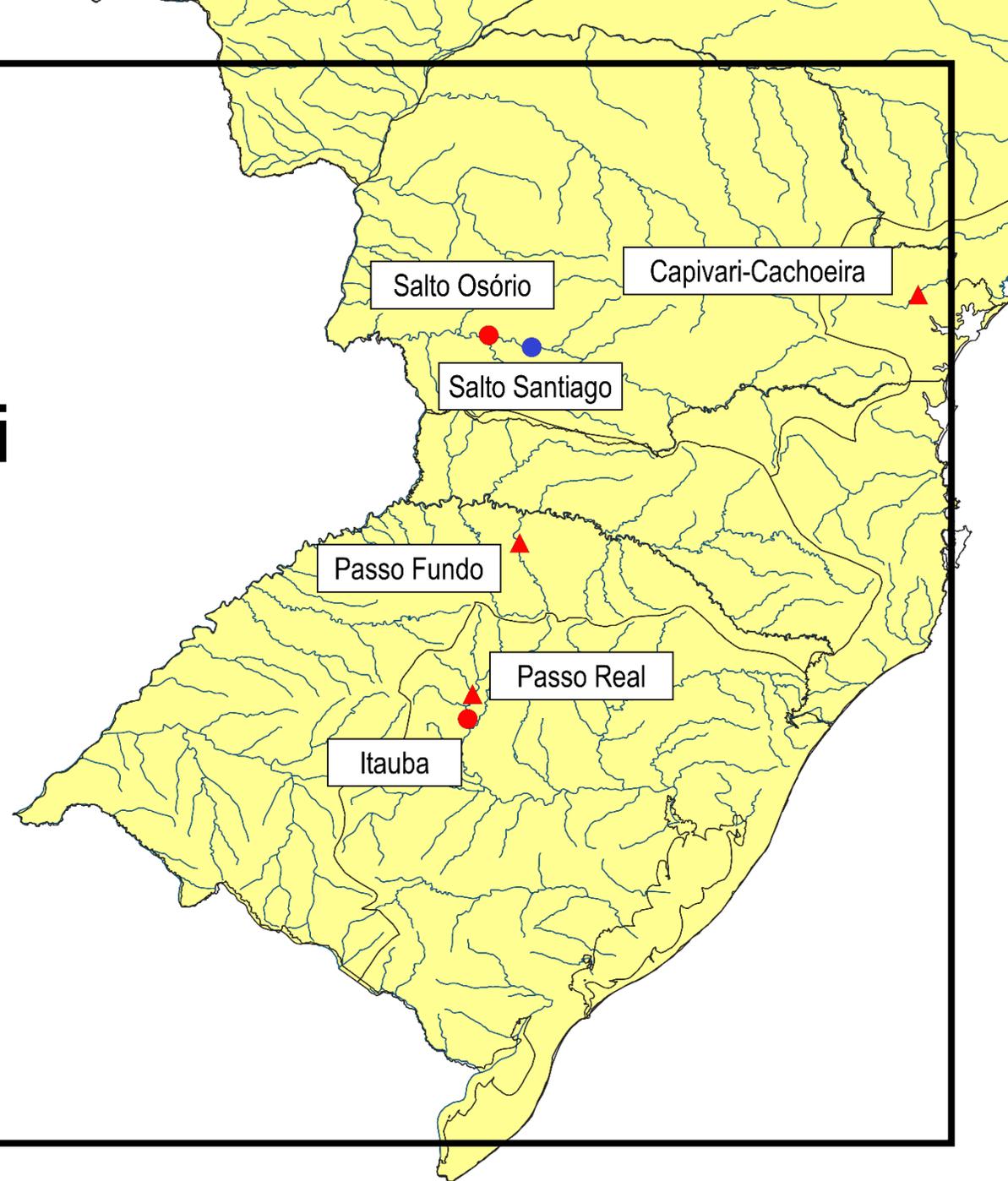
1976

Suprimento até 1980



1980

depois: expansão rio Uruguai



Recomendações

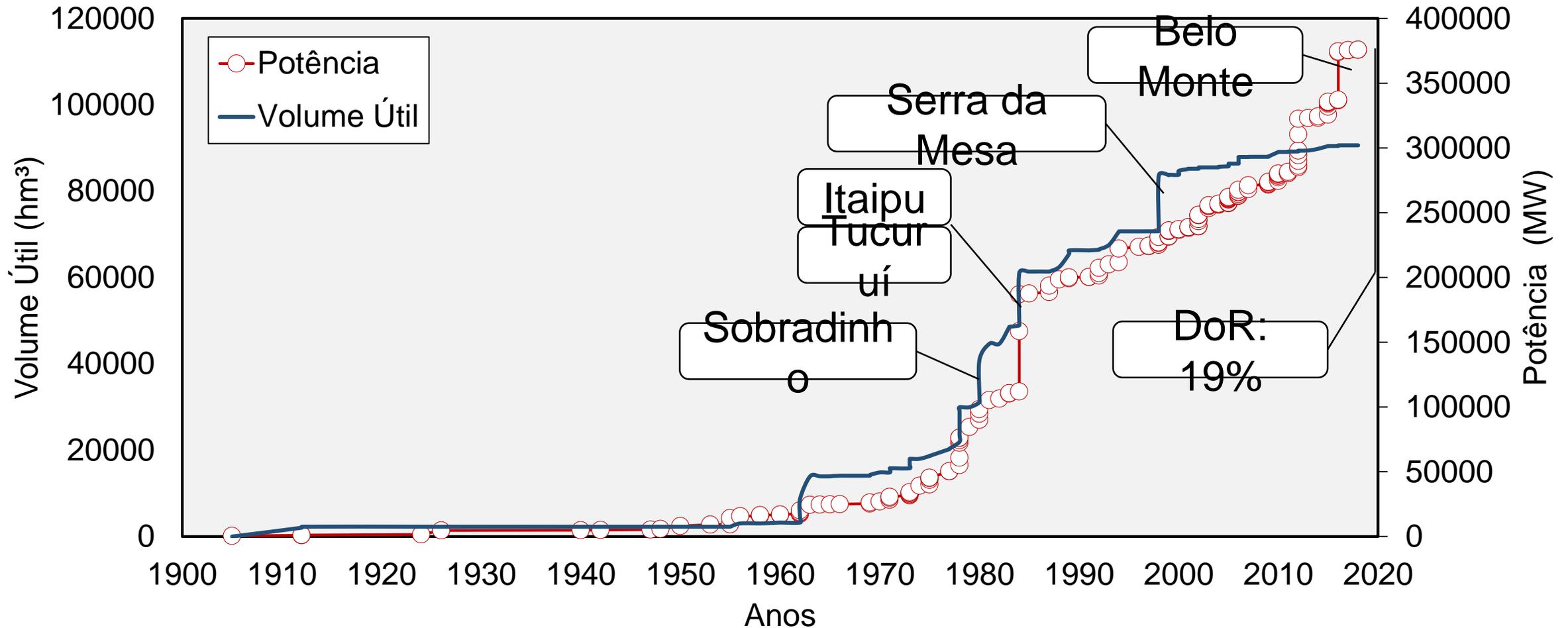
deplecionar e encher rapidamente os reservatórios

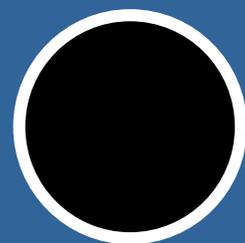
esforço para a construção de outros reservatórios

“somente assim há **aproveitamento pleno** dos recursos hídricos”

Evolução até 2018

(Bertone, et al. (2019)
38th IAHR World
Congress)

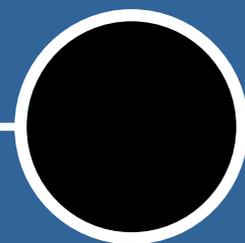




passado



presente



futuro

Presente

predominância hidrelétrica

complexidade do sistema



A word cloud of acronyms in various sizes and orientations. The most prominent acronyms are ENA, MRE, and CCEAR. Other visible acronyms include RIMA, CMO, PMO, GF, MLT, GSF, EIA, VAR, CCE, ACL, PLD, ACR, and MCSD.

RIMA
MCSD
ACR
ENA
CMO
PMO
GF
MLT
EIA
GSF
PLD
MRE
VAR
CCE
ACL
CCEAR

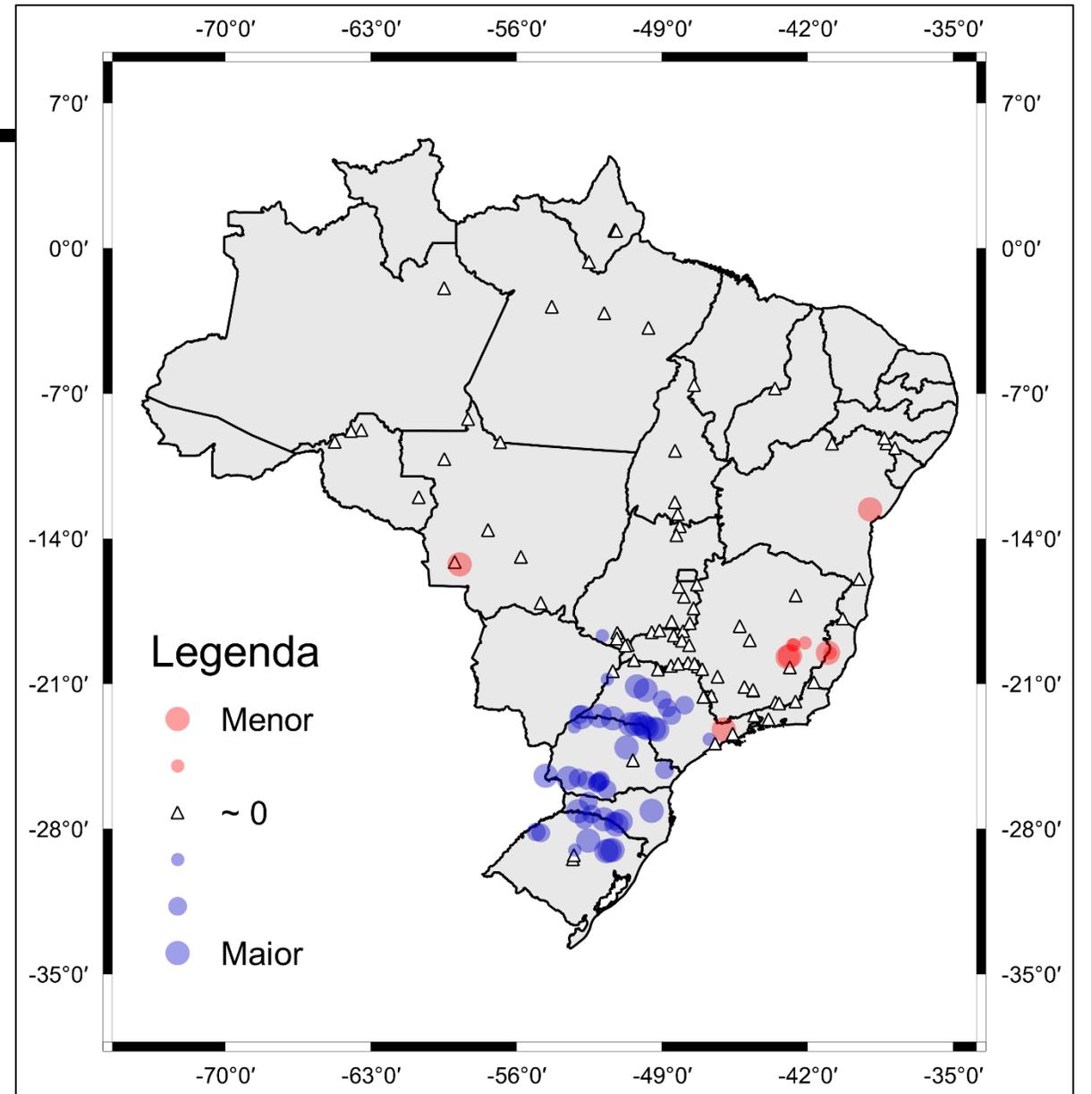
MLT
qual?

Tendências ML

Mann-Kendall com 5%
significância

Vazões médias anuais

Dados: ONS
(Detzel, et al. (2018), XI
CBPE)



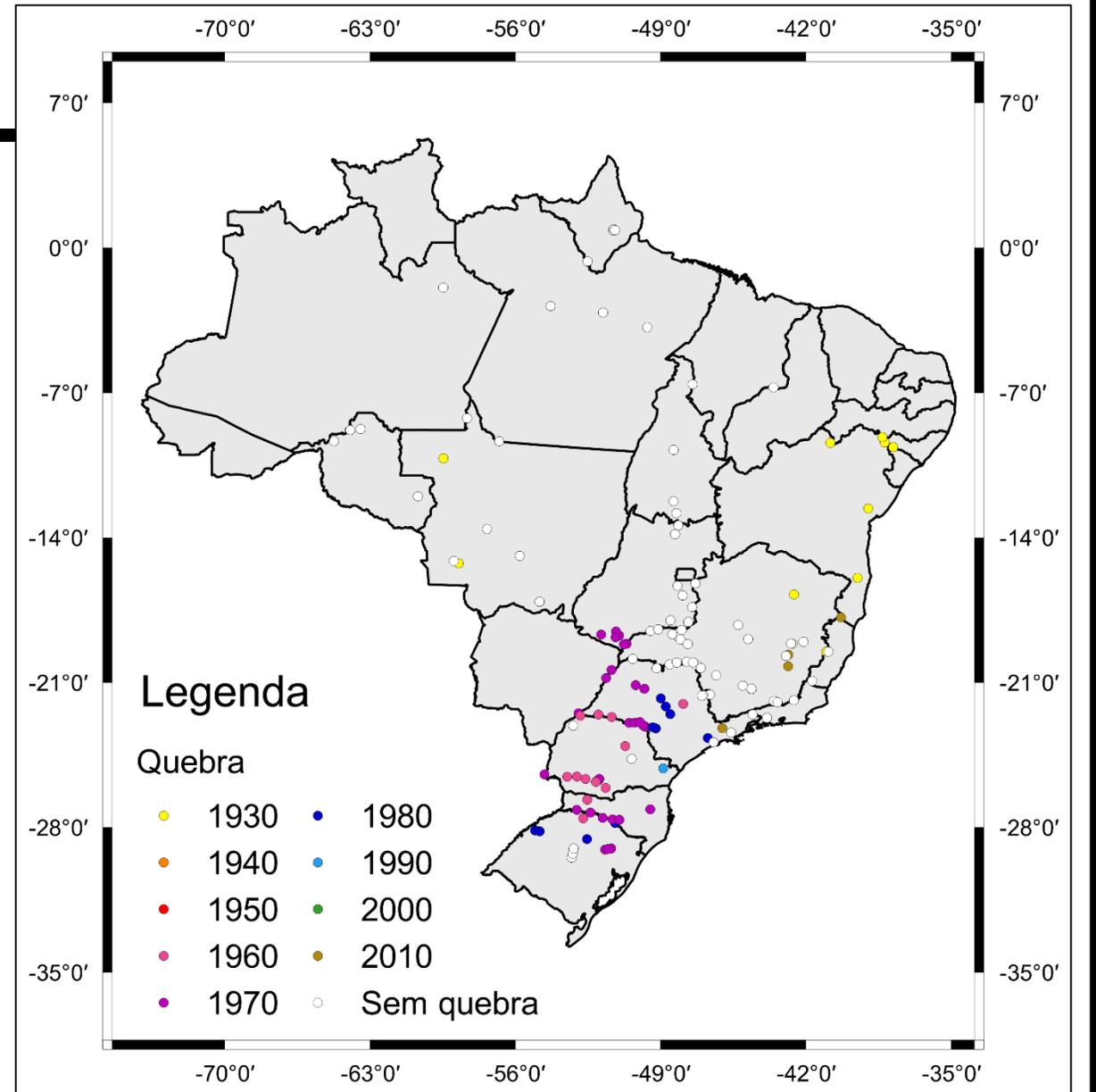
Tendências ML

Pettitt com 5% significância

Vazões médias anuais

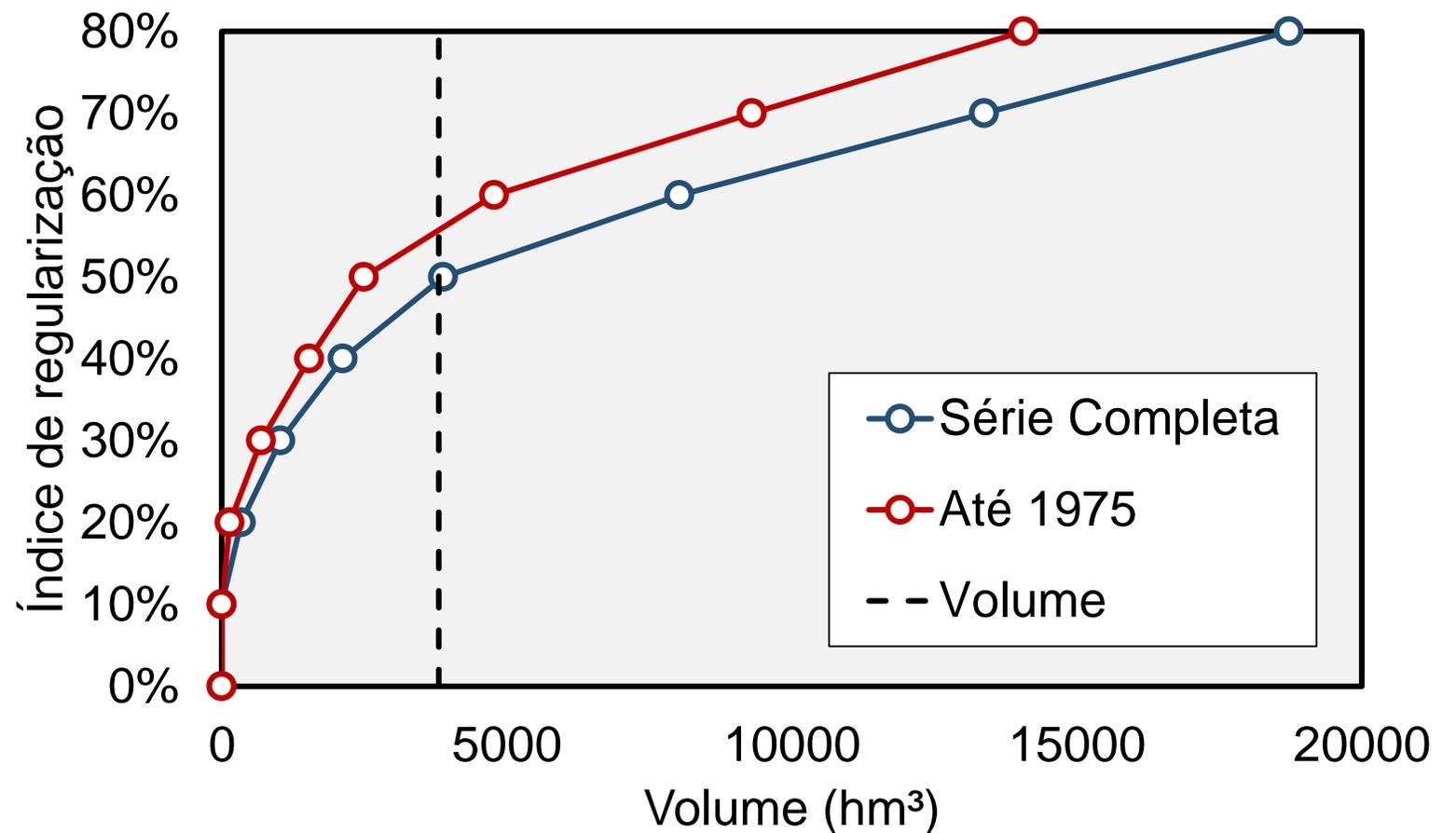
Dados: ONS

(Detzel, et al. (2018), XI
CBPE)



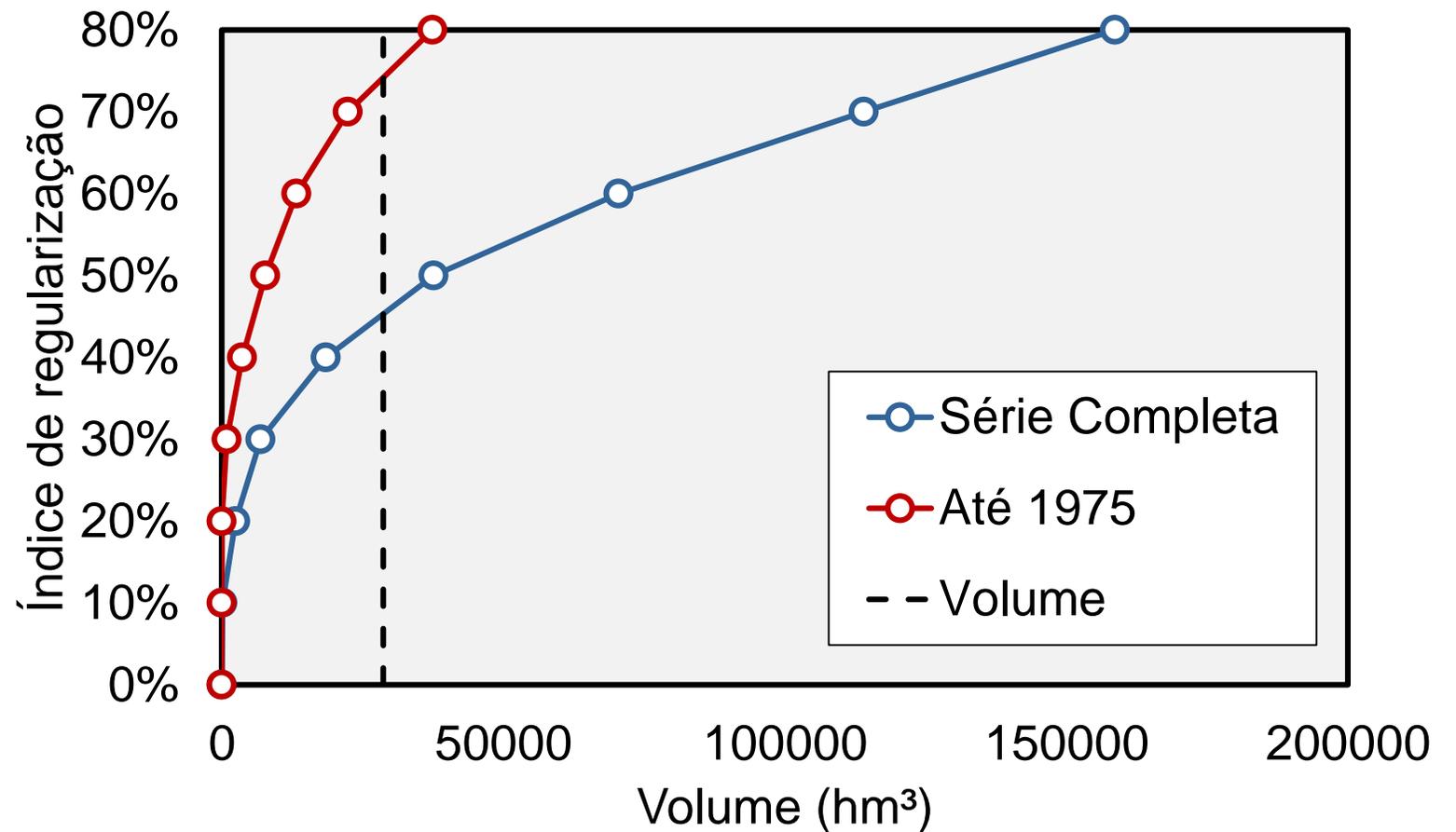
Reflexos na regularização

UHE Foz do Areia



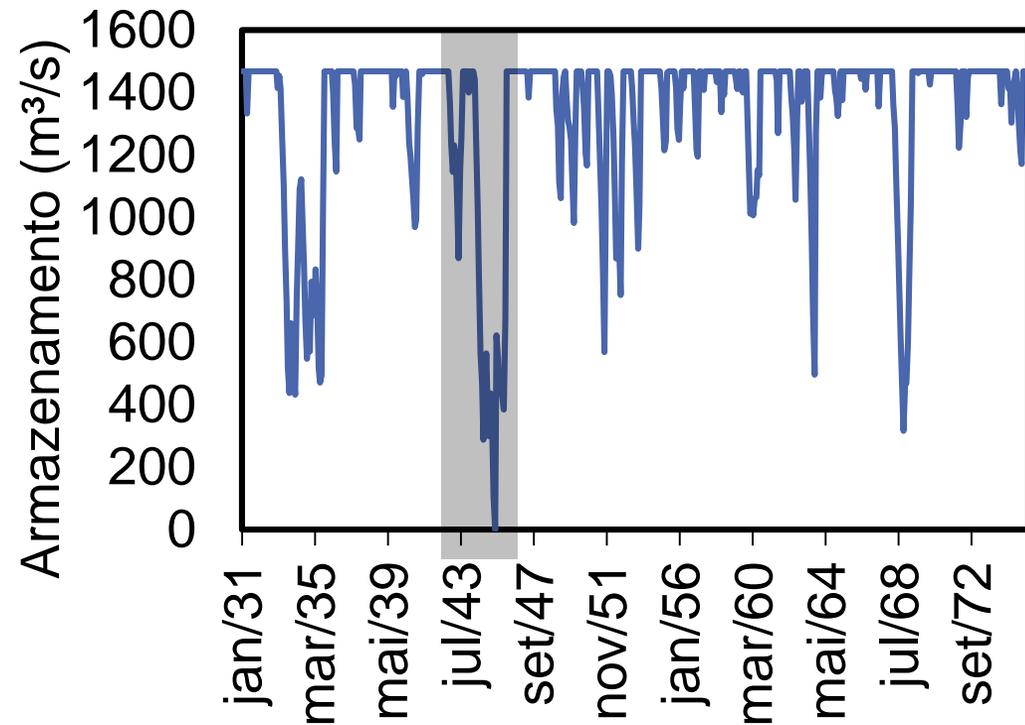
Reflexos na regularização

UHE Sobradinho

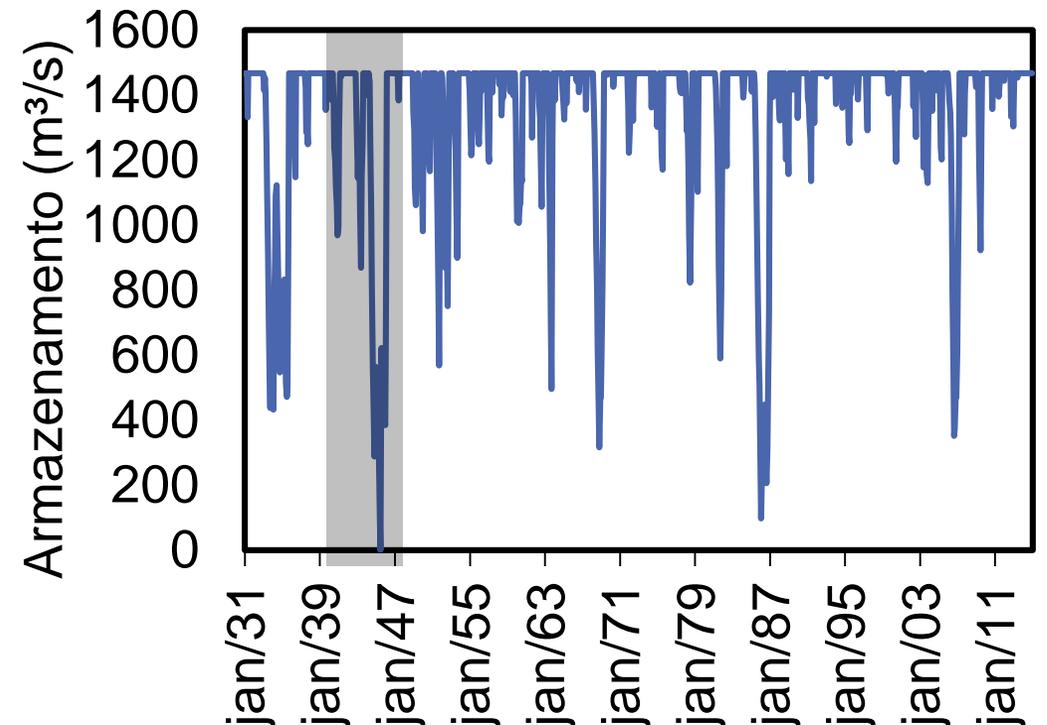


Período crítico de vazões

UHE Foz do Areia



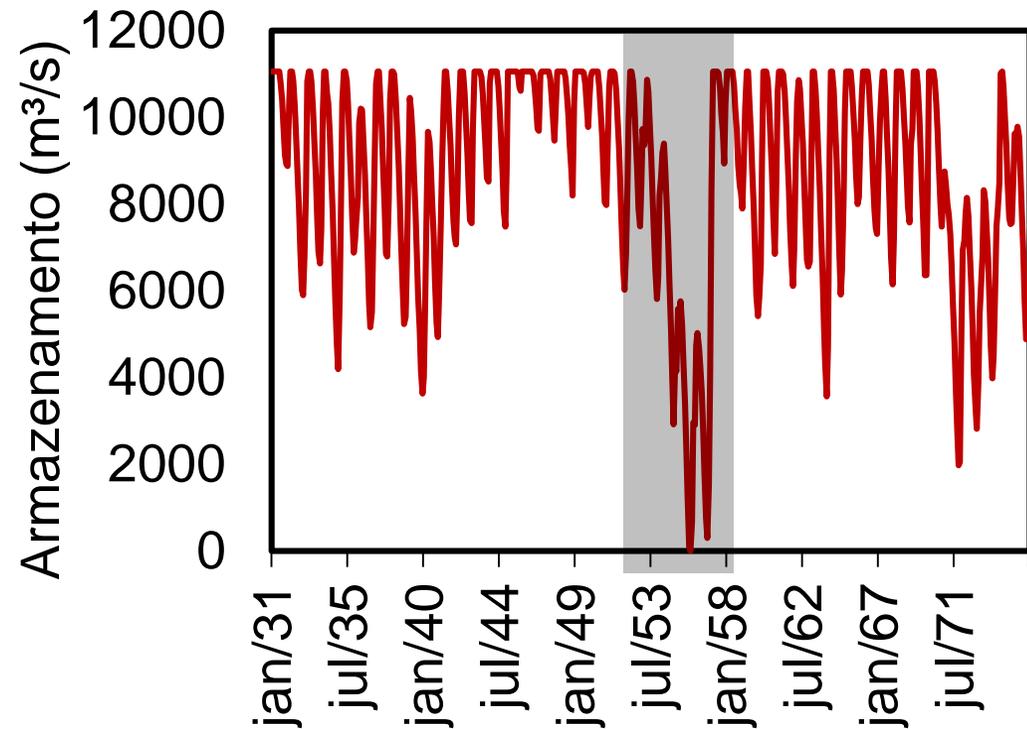
Até 1975



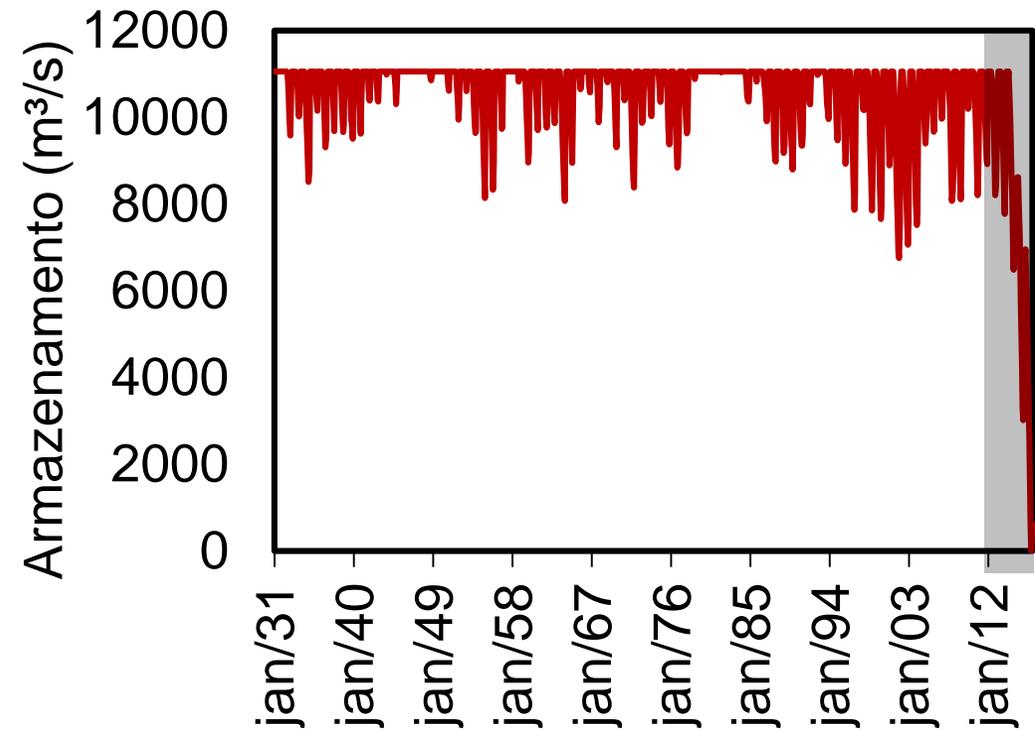
Até 2017

Período crítico de vazões

UHE Sobradinho



Até 1975



Até 2017

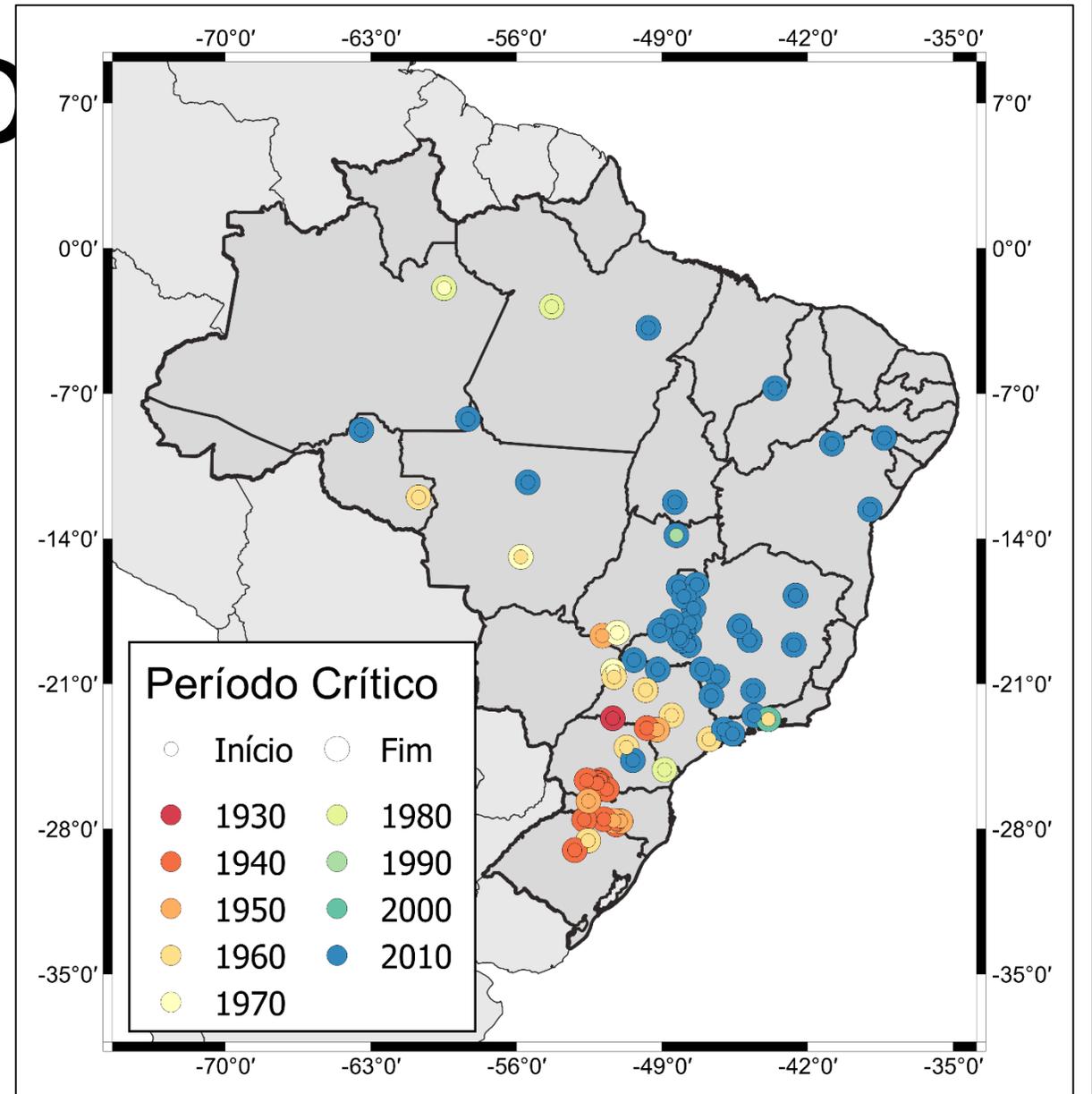
Período Crítico

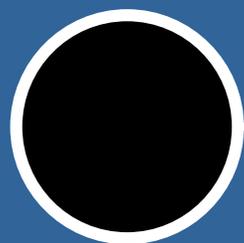
Vazões médias mensais

UHEs de regularização

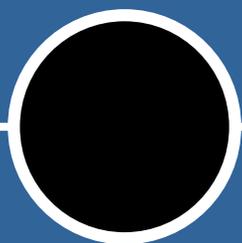
Dados: ONS

(Detzel, et al. (2019), XXIII
SBRH)

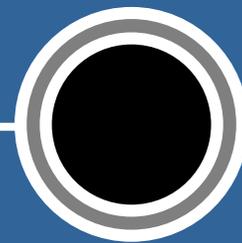




passado



presente



futuro

Futuro

mudanças climáticas

usinas reversíveis

repotenciação

outras fontes de energia

novos
reservatórios

An aerial photograph of a large dam and hydroelectric power plant. The dam is a long, reddish-brown structure across a valley. To the left is a large reservoir. To the right, water is being released from the dam, creating a large plume of white mist. The surrounding landscape is lush green with rolling hills and valleys. There are several winding roads and power lines visible. The text is overlaid in the center of the image.

somente assim haverá
aproveitamento pleno dos recursos
energéticos

Agradecimentos



daniel@lactec.org.br |  danieldetzel