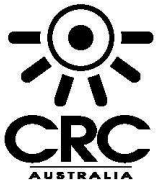

Flooding of a Pacific Atoll Island: Diagnosing the Problem

John Hunter

Antarctic Climate & Ecosystems

Cooperative Research Centre

Hobart, Tasmania, Australia

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- Acknowledgements:
  - Briar March and Lyn Collie, On the Level Productions
  - Tim Bayliss−Smith, University of Cambridge
  - Aquenal Pty Ltd and John Gibson for the loan of pressure recorders

Two Perceptions .....

The Independent (UK), speaking about Takuu Atoll:

The 400 inhabitants of the atoll off the coast of Papua New Guinea are likely to be the first people in the world to lose their homeland to global warming. . . . Now the islanders . . . have been told that they have at best five years, and at worst a few months, before their homes vanish for ever beneath the waves.

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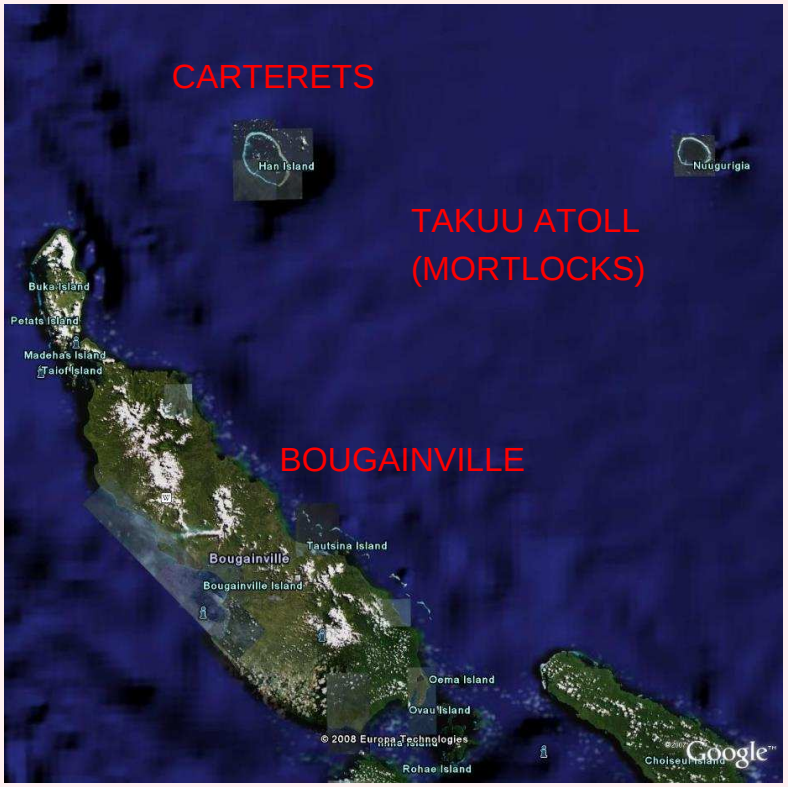
Ian Mott (Australian 'climate sceptic'):

Most coral atolls are on volcanic peaks and these are usually made up of comparatively spongy rock . . . . And the weight of the coral and the soaking of water actually makes them all prone to sinking . . . this was first recognised by none other than Charles Darwin a century ago.

Takuu Atoll (the Mortlock Islands)



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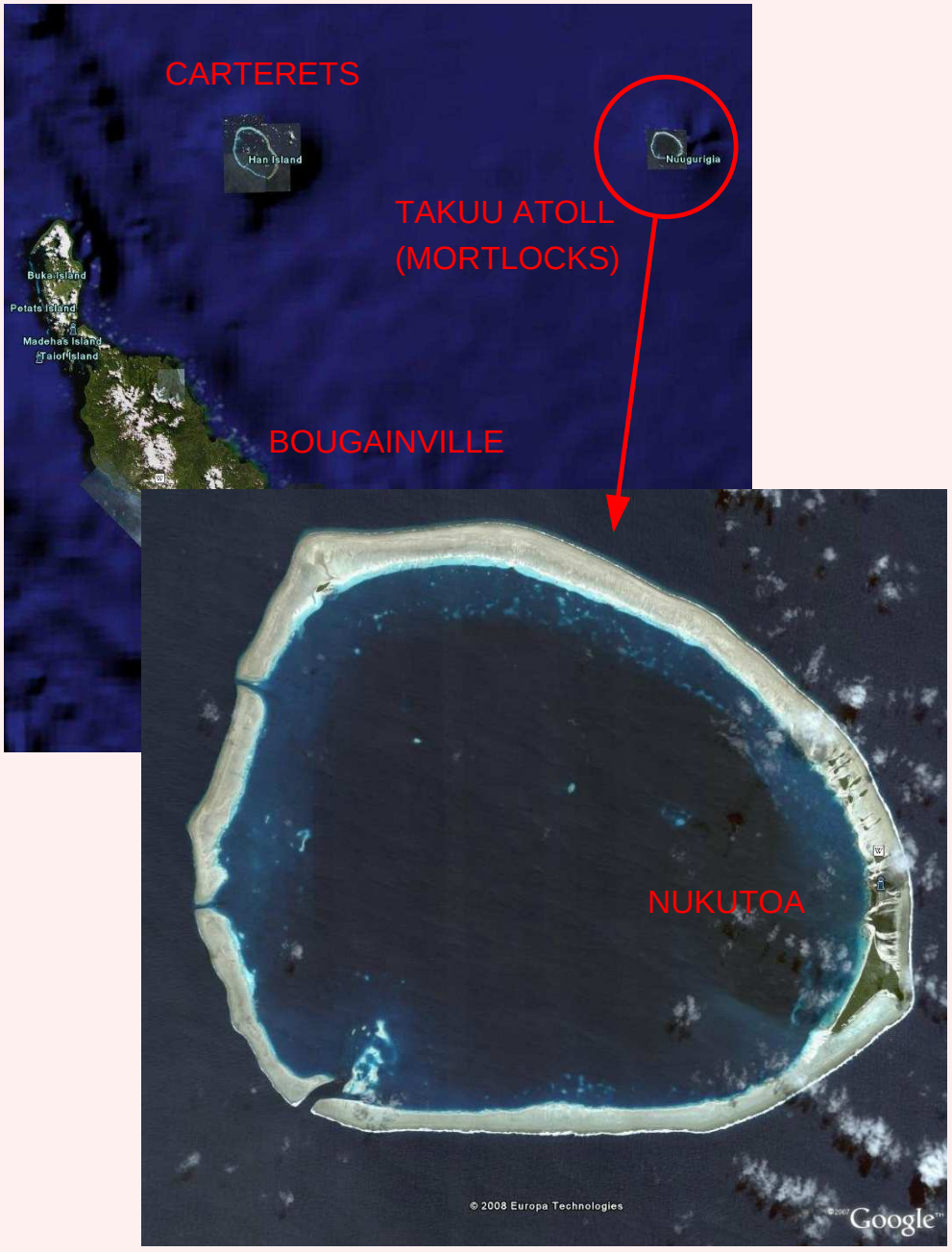

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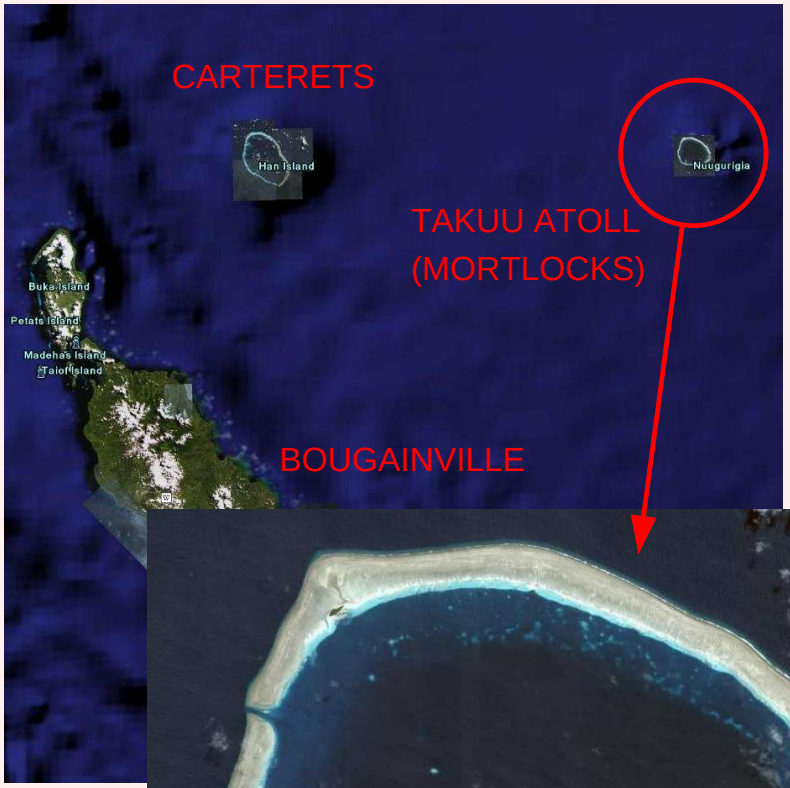

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- Collection of anectodal information

Anecdotal Information on Flooding

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Nukutoa in 1943 and Now

Source of 1943 coastline: Tim Bayliss−Smith

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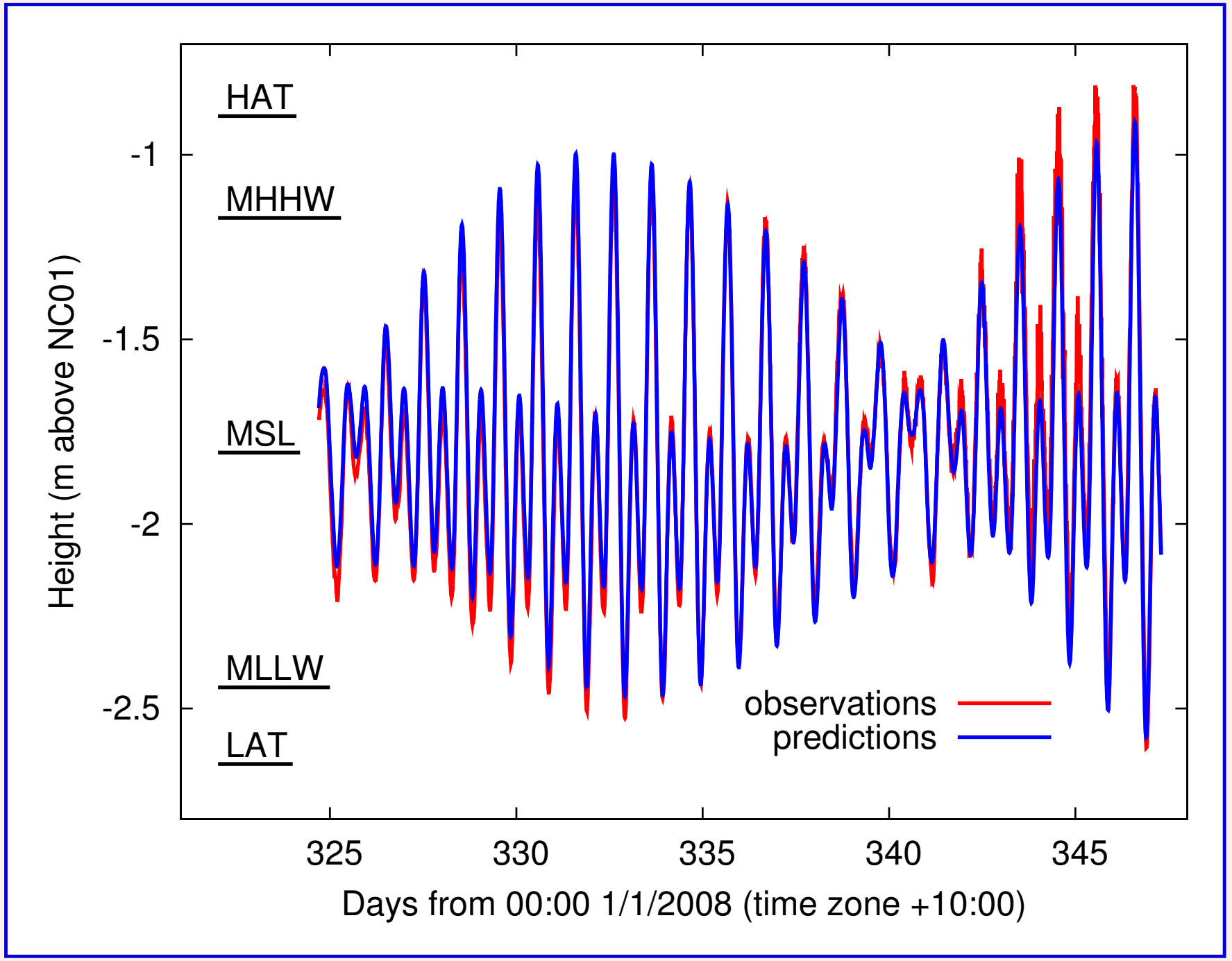
Tide–Gauge Observations on Nukutoa



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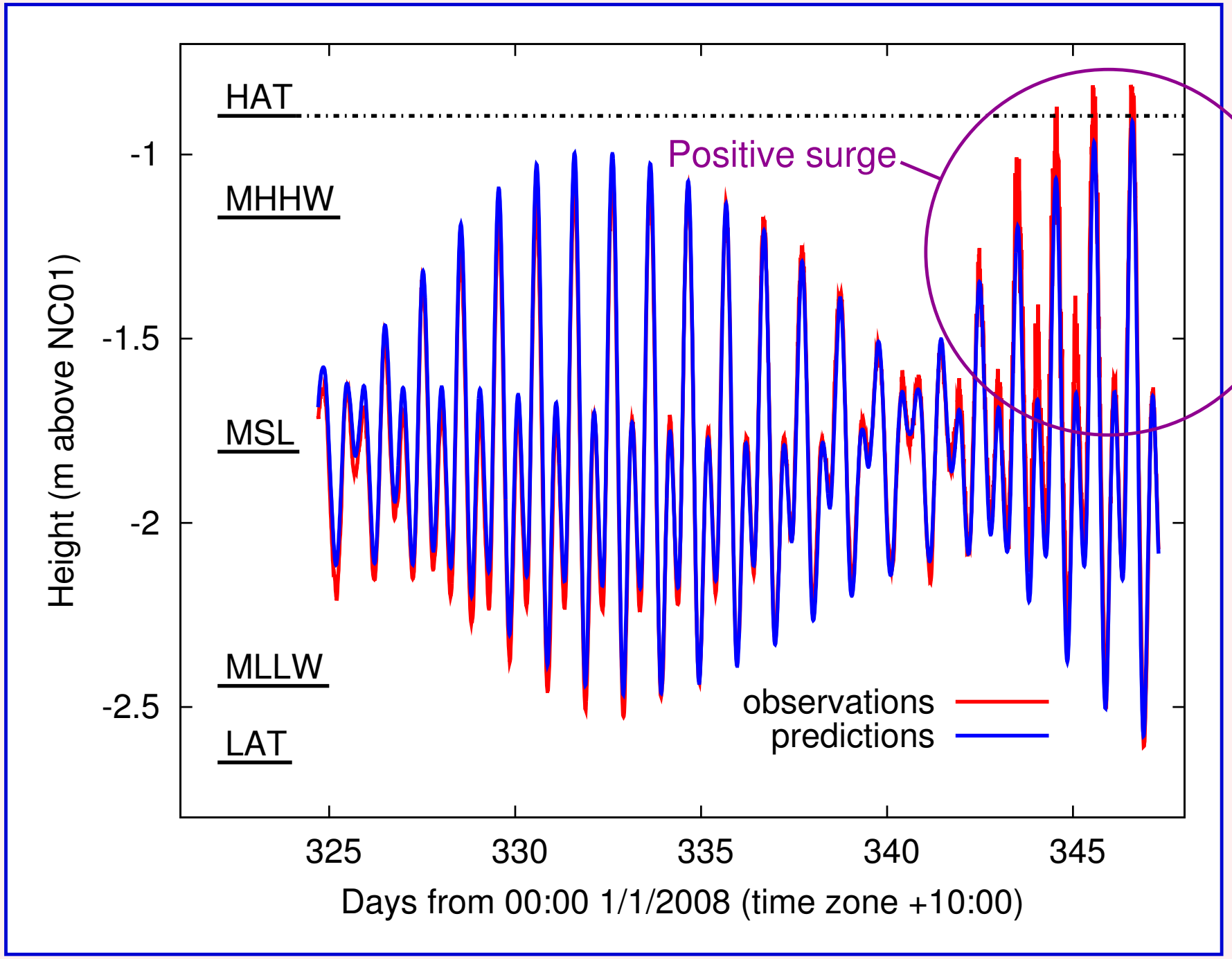

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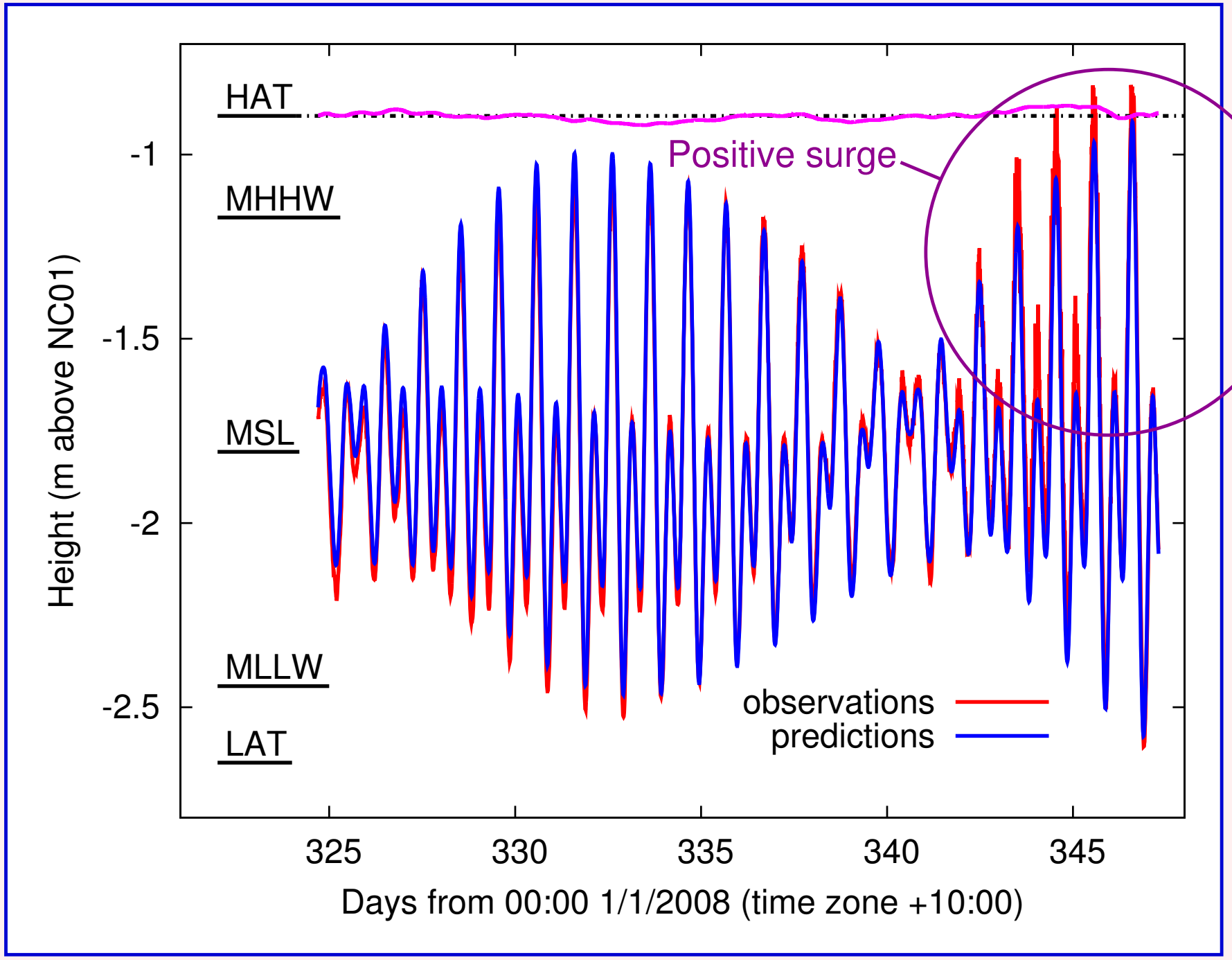

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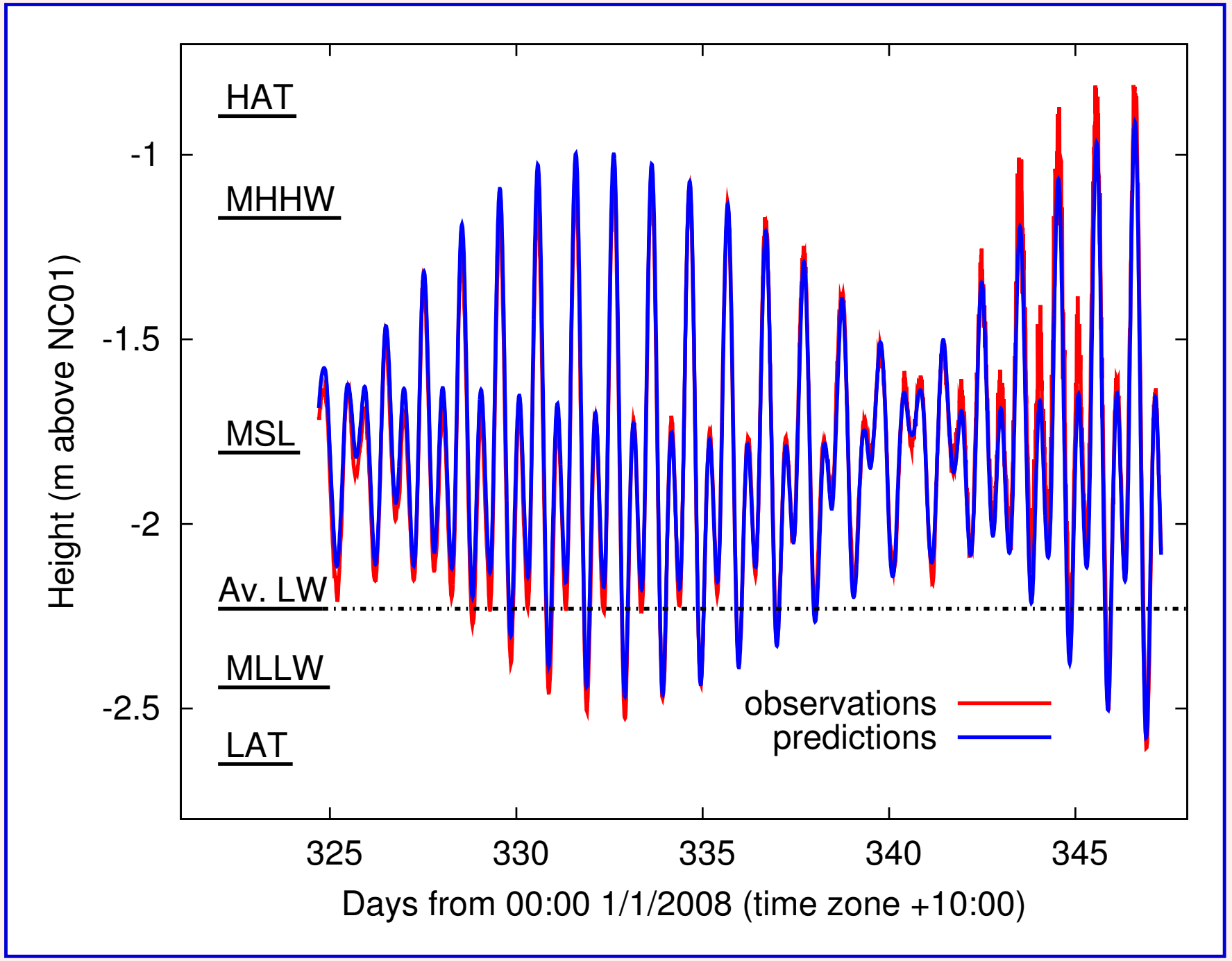

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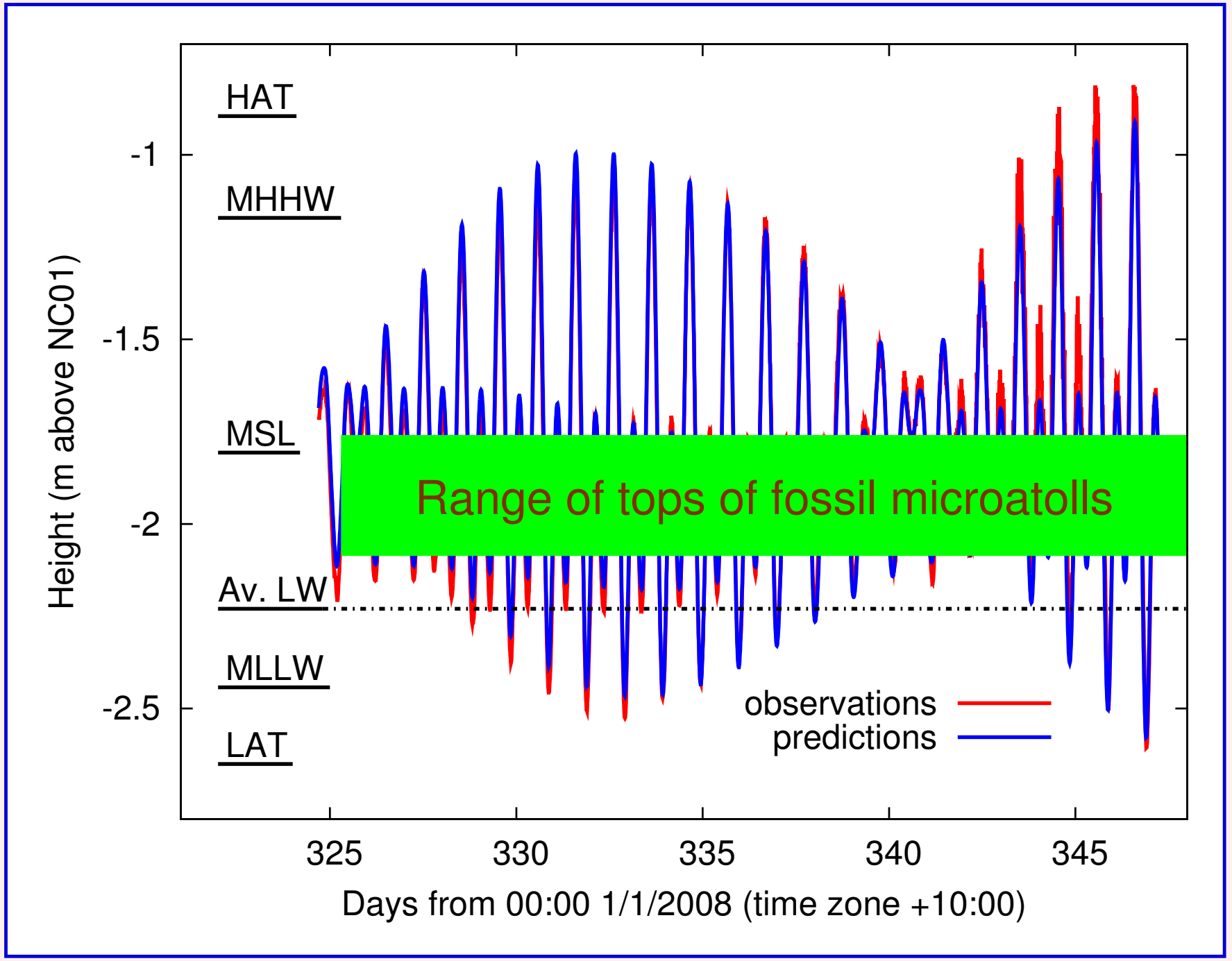

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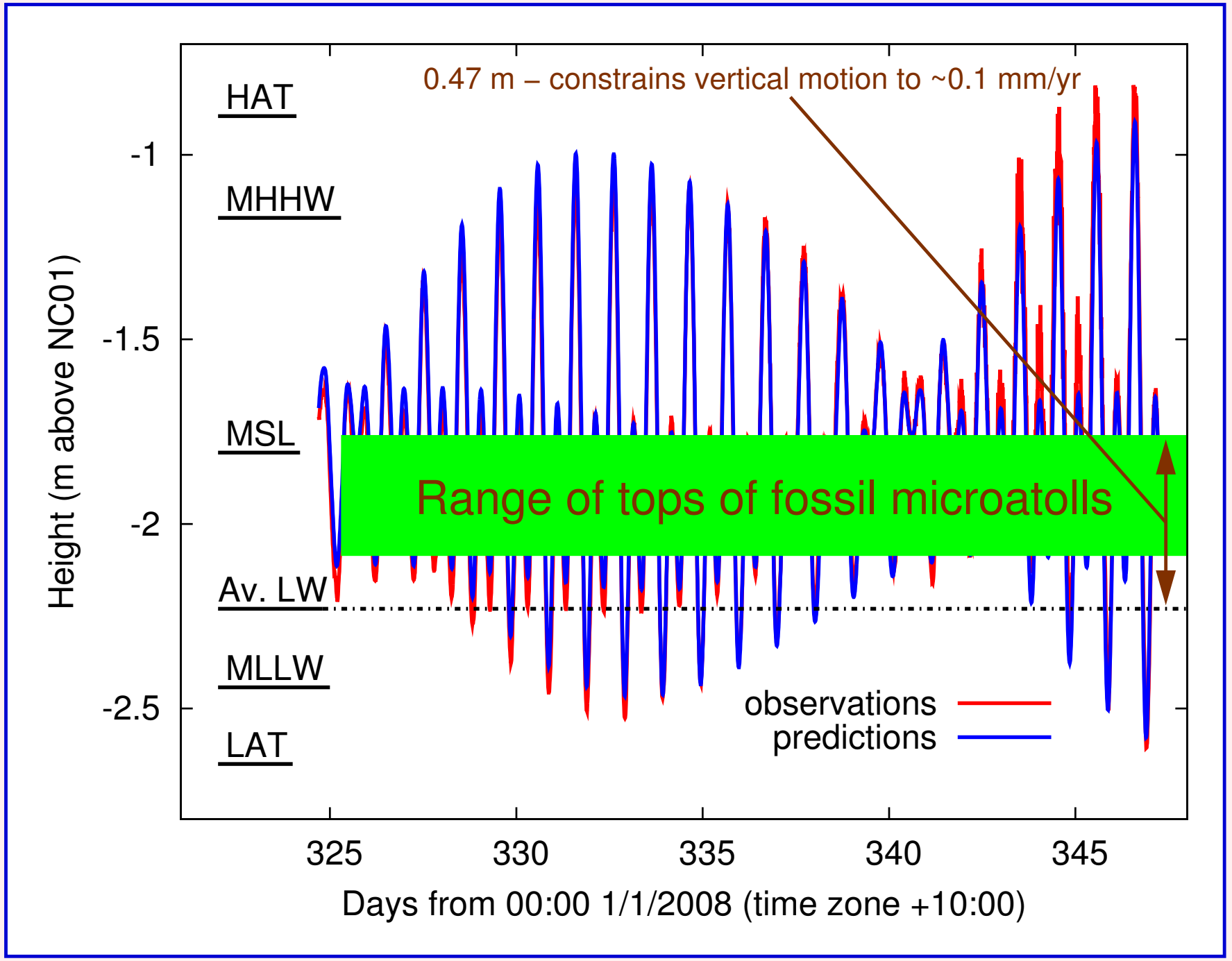

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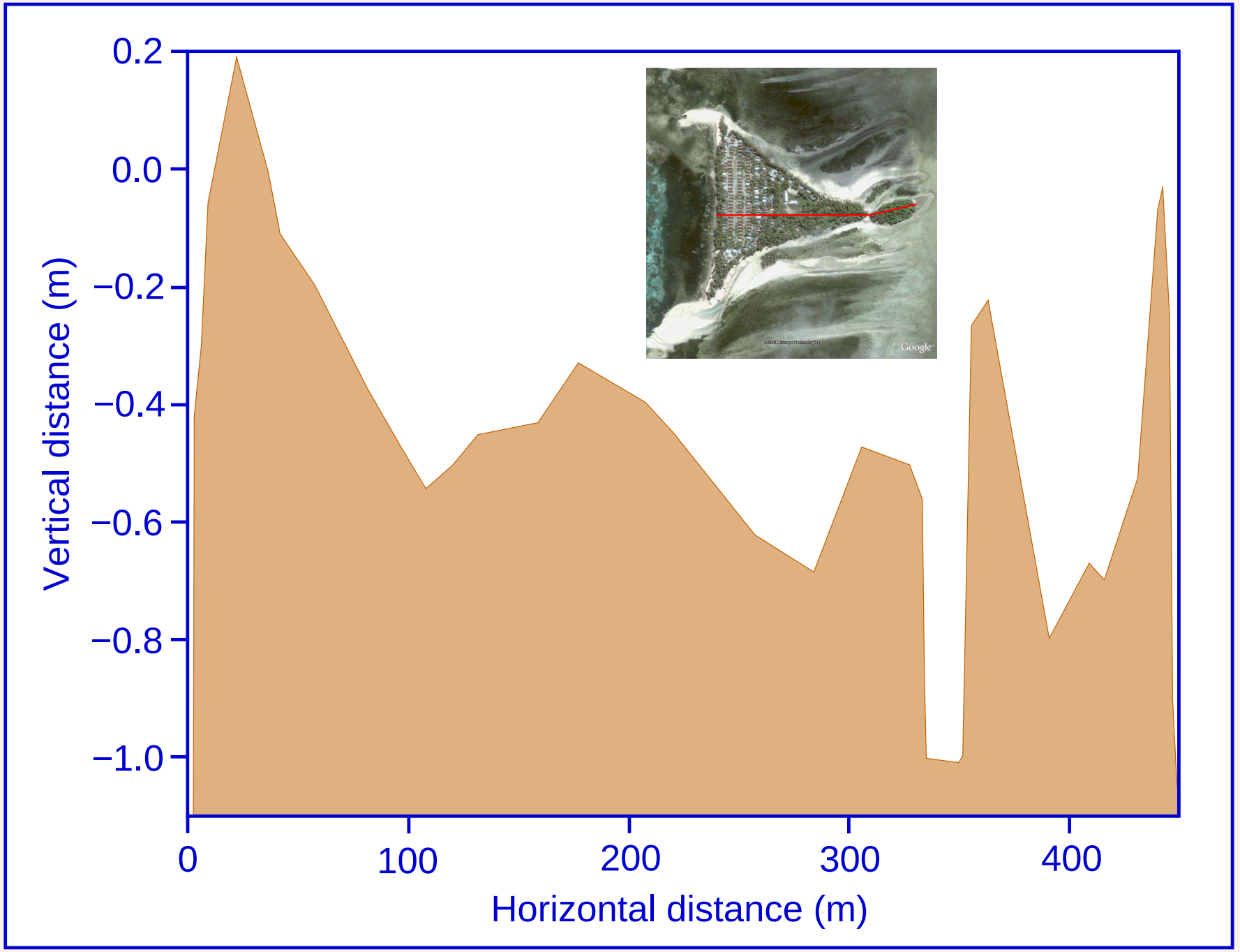

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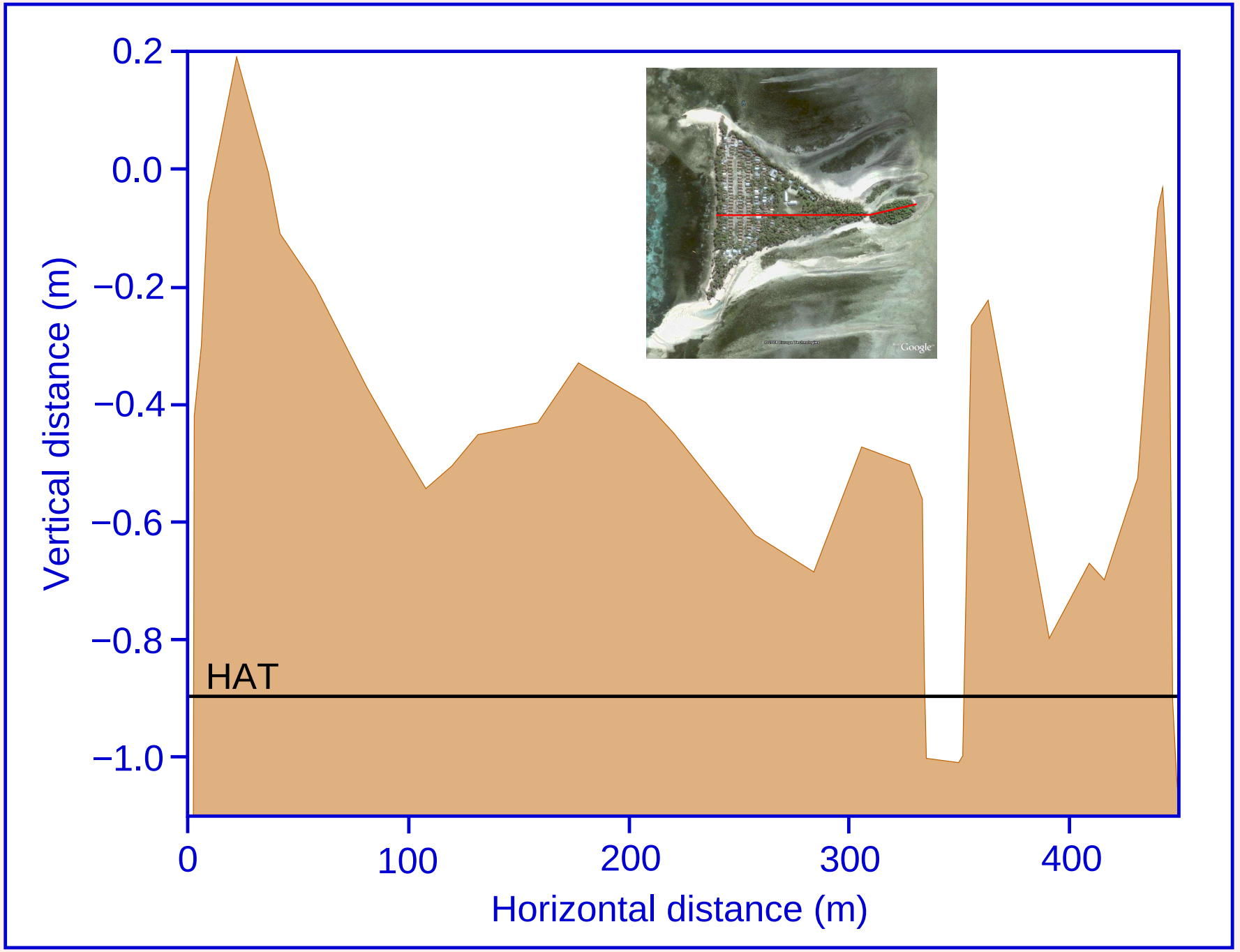

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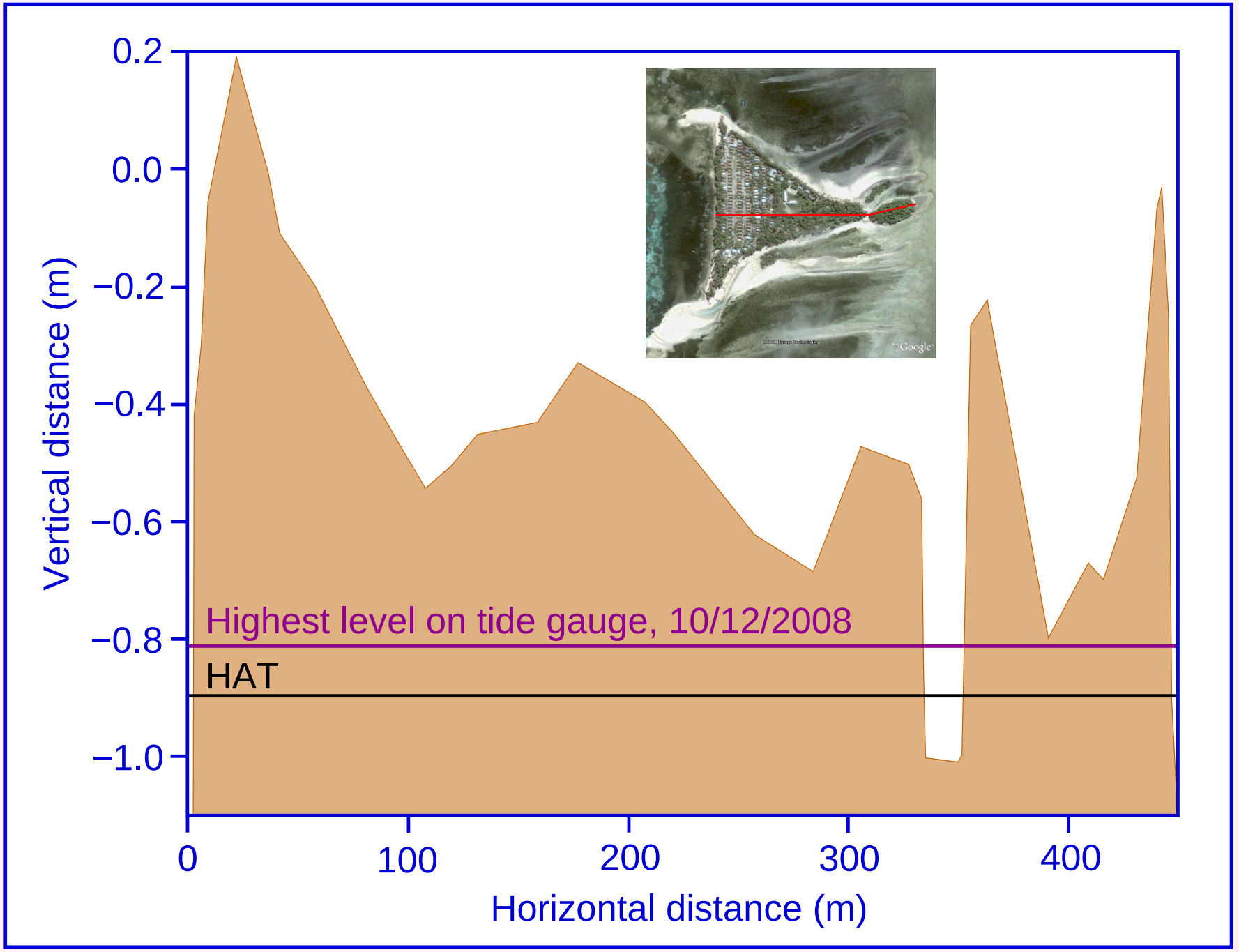

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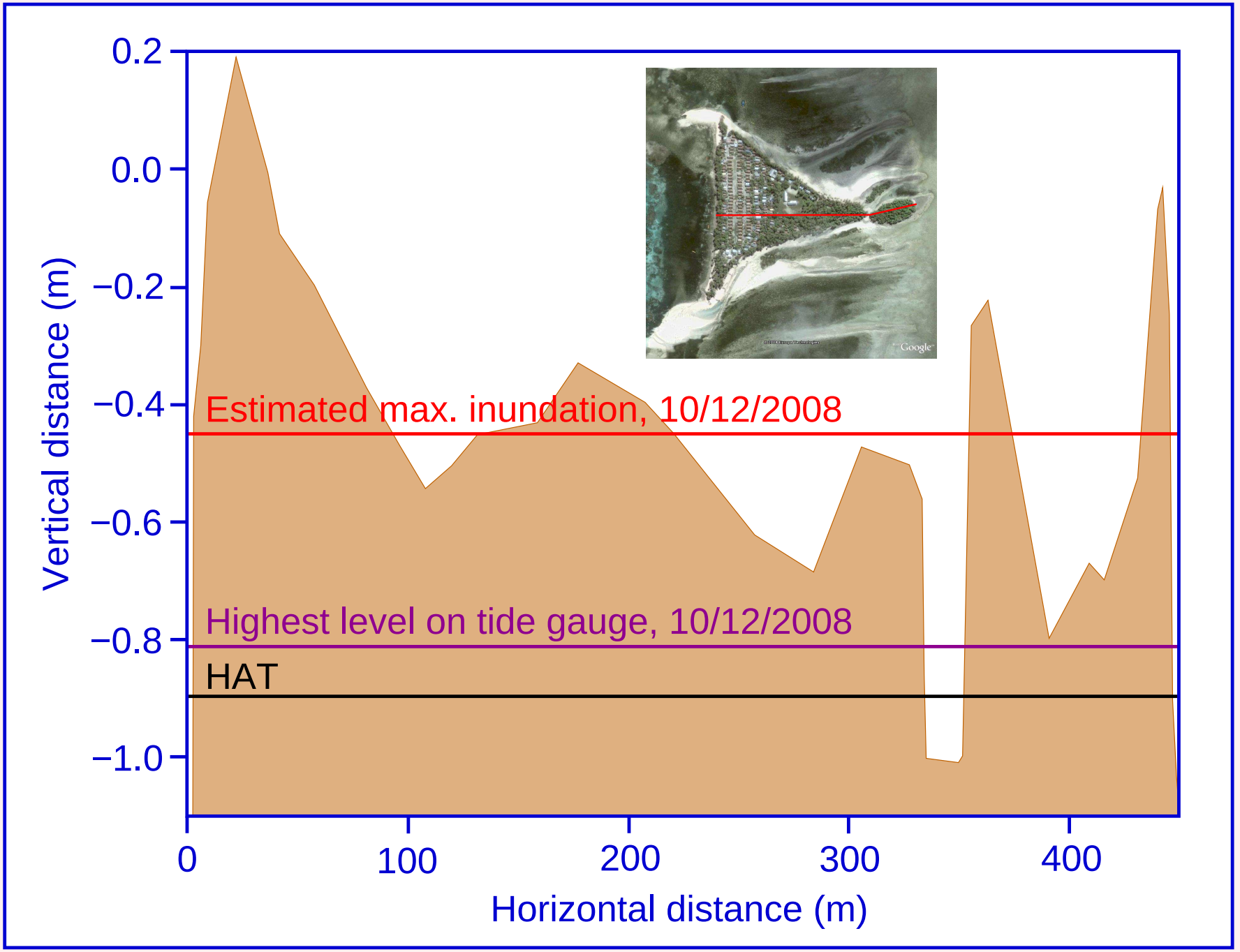

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- Various observations during and after flooding of 10/12/2008

The Flooding of 10 December 2008

- Caused by a combination of:
  - High tide close to HAT
  - A barometric surge (5−10 cm)
  - Long−period waves − hydraulic jumps of period 5−10 minutes
    (varying wave setup caused by breaking waves on fringing reef?)

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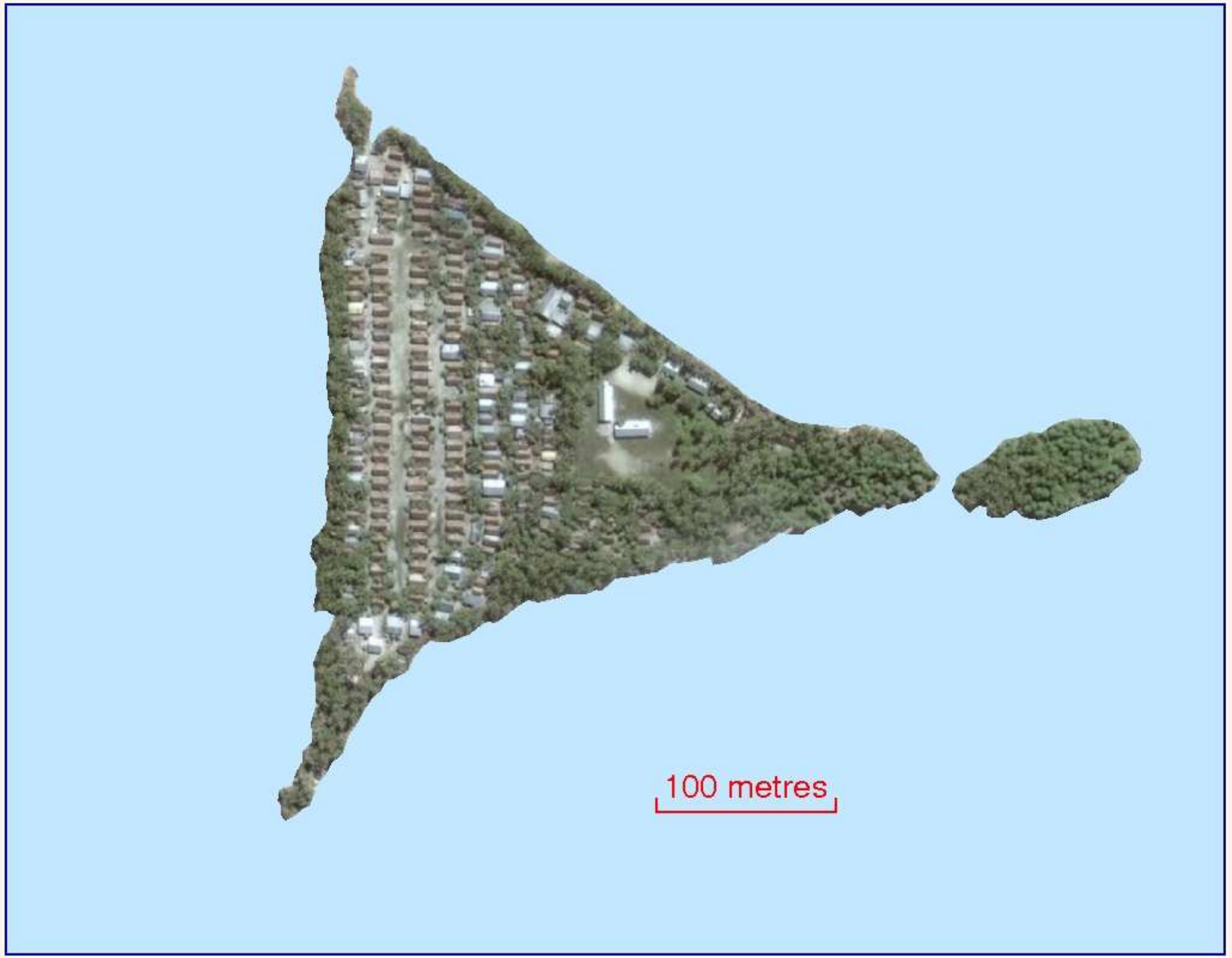
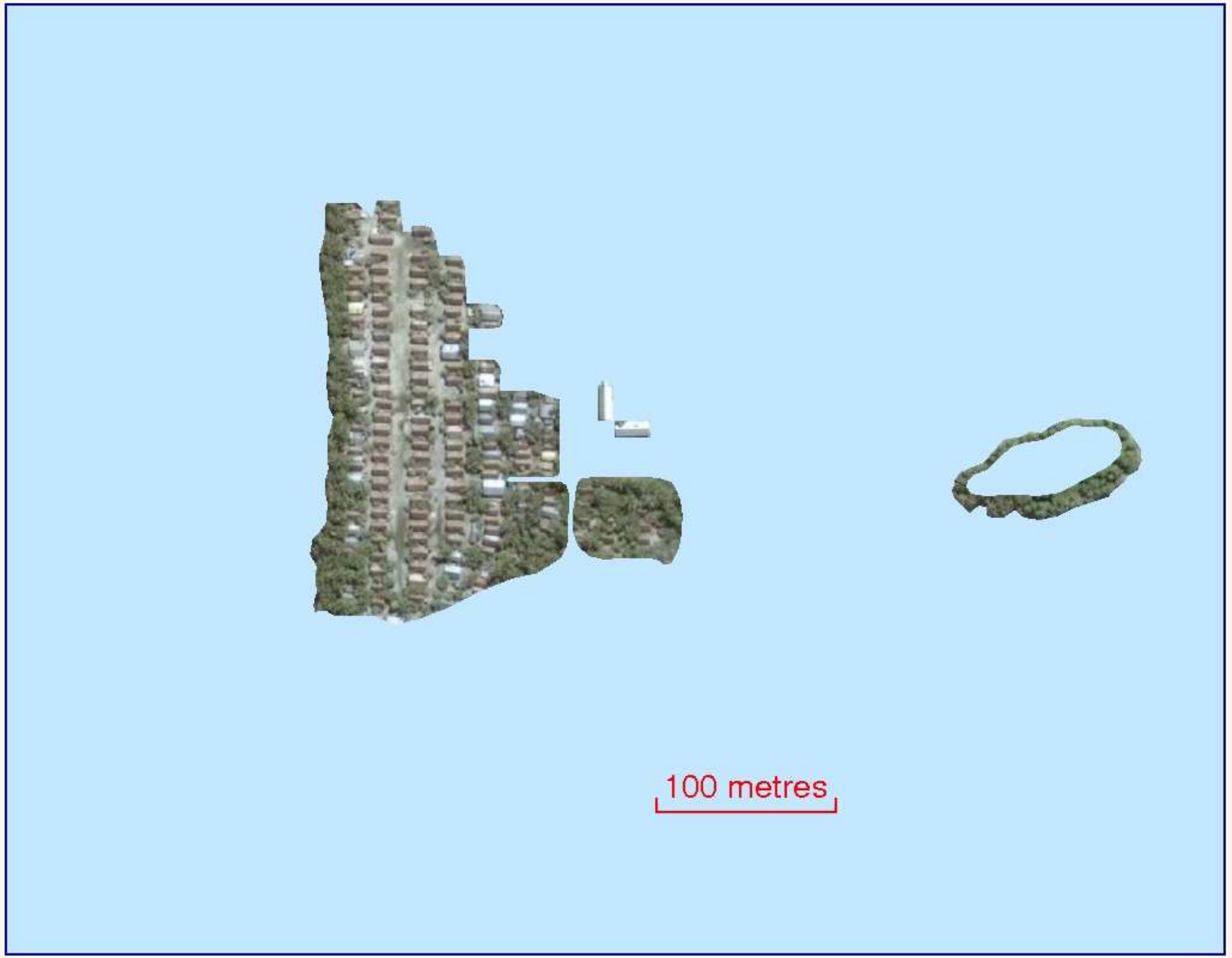
Normal Coastline of Nukutoa



Coastline of Nukutoa, 10 Dec. 2008



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- Damaged around 20 huts
- Destroyed school library

The School Library

Damaged Schoolbooks

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- ..... so long as coral can survive global warming and ocean acidification

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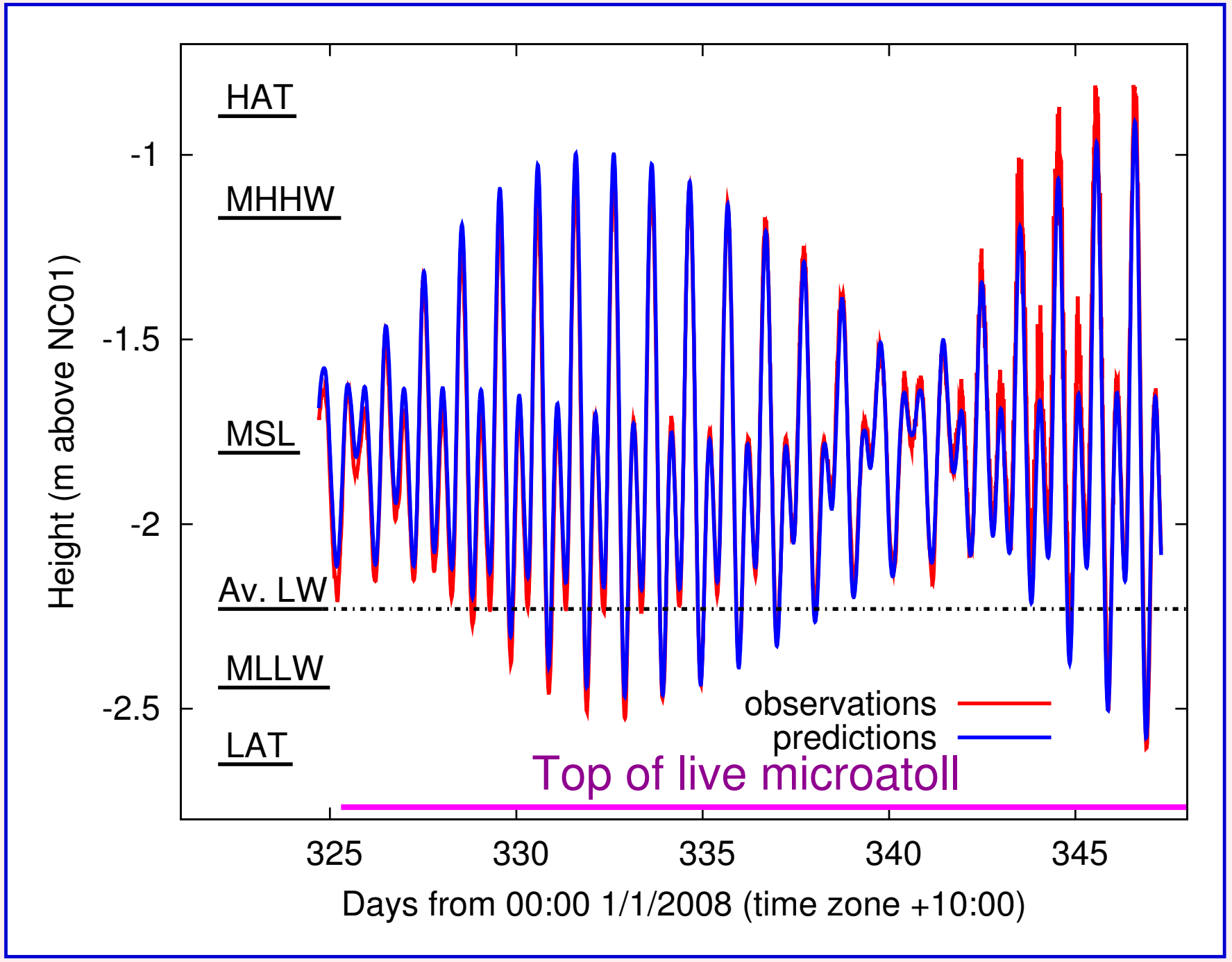

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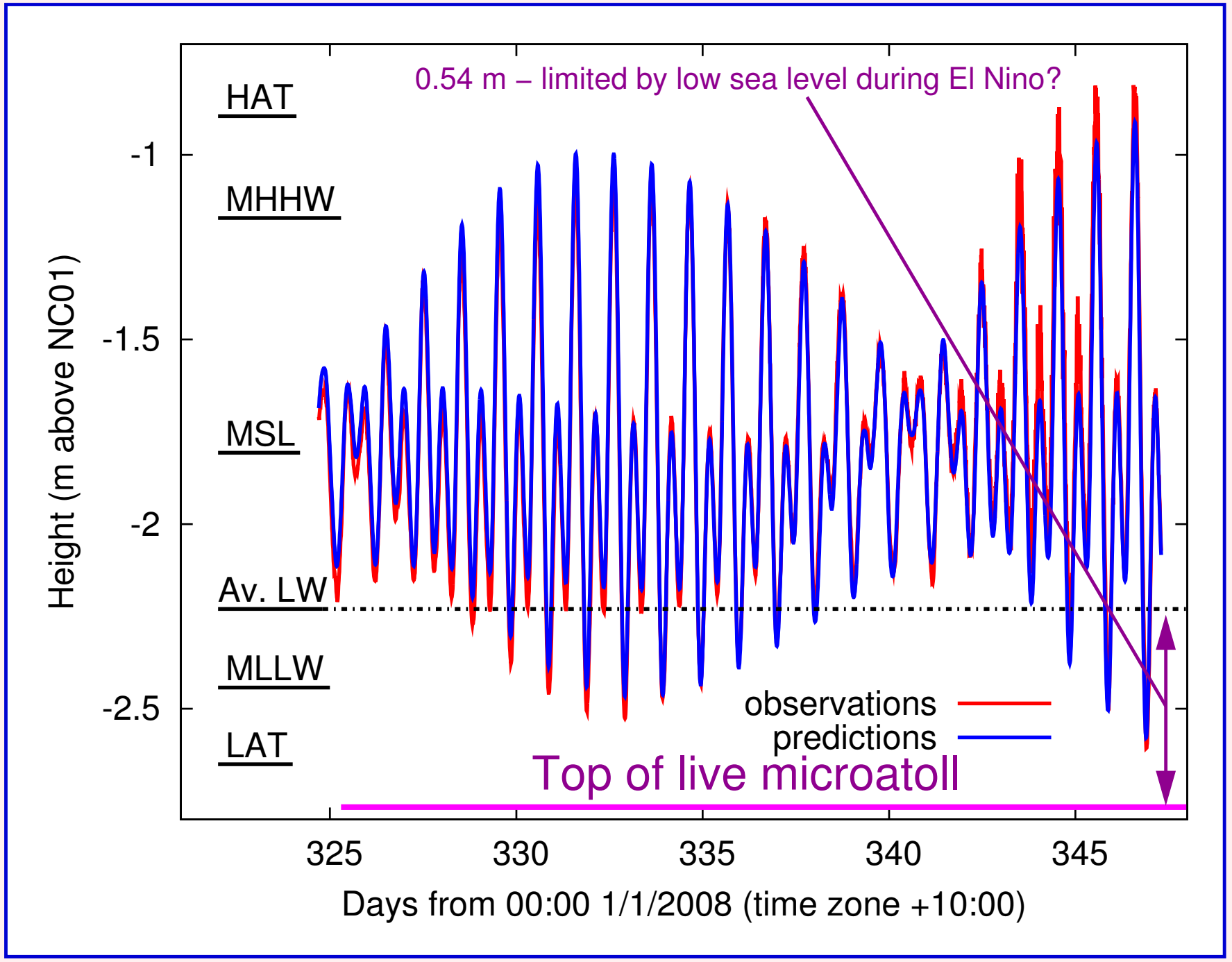

Tide−Gauge Observations at Honiara (609 km From Nukutoa)