

# Climate Related Sea Level Change – An Inconvenient Fact or an Irritating Fiction



**Emeritus Professor John Hannah  
University of Otago  
Dunedin, New Zealand**

XXV International Federation of Surveyors  
Congress, Kuala Lumpur, Malaysia, 16 – 21 June  
2014

3/07/2014

1

## OVERVIEW

1. Introduction
2. The Assertions to be Refuted
  1. No rising trend in global sea levels in 20<sup>th</sup> C.
  2. Satellite altimetry results have been fudged.
  3. Sea levels in the Maldives fell 0.2-0.3 m prior to 2004.
  4. No sea level rise at the Tuvalu Islands.
3. Future Sea Level Change

XXV International Federation of Surveyors  
Congress, Kuala Lumpur, Malaysia, 16 – 21 June  
2014

3/07/2014

2

# Introduction

- Lord Christopher Monckton, a well known sceptic, quotes Prof. Nils-Axel Mörner as his source for the view that there is "*absolutely no trend*" in global sea levels.
- Mörner, a paleogeophysicist, asserts that with regard to sea level rise expertise, "*no one has beaten me*".

XXV International Federation of Surveyors  
Congress, Kuala Lumpur, Malaysia, 16 – 21 June  
2014

3/07/2014

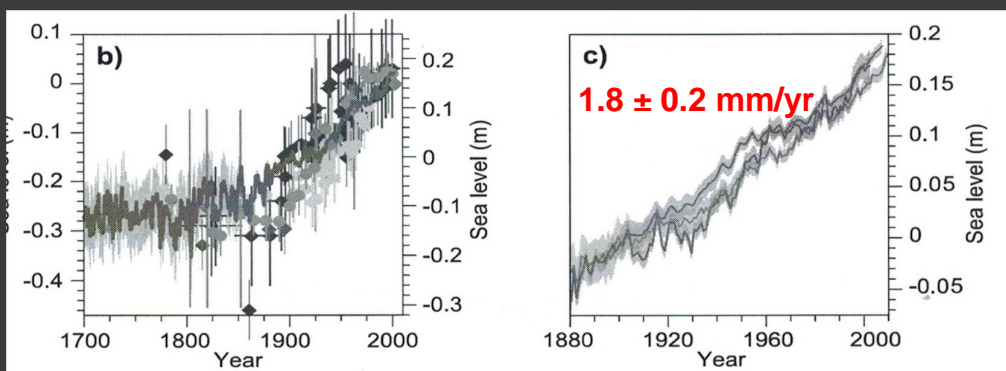
3

## Assertion 1

# No Rising Trend in Global Sea Levels in the 20<sup>th</sup> Century

### Basic Errors:

- No knowledge of TG monitoring techniques
- No analysis of a global set of stable TGs.



XXV International Federation of Surveyors  
Congress, Kuala Lumpur, Malaysia, 16 – 21 June  
2014

3/07/2014

4

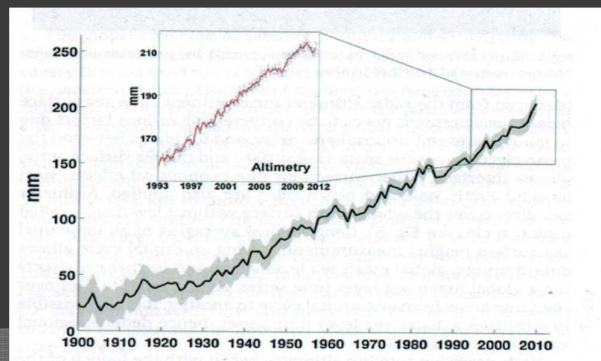
## Assertion 2

# Satellite altimetry results have been fudged

### Basic Errors

- Doesn't understand altimeter calibration. TG data is needed for this task.
- Incorrectly dismisses Douglas's 1991, 1995, and 1997 GSL rise analyses [1.8 mm/yr since 1900] as being "*widely debated and far from generally accepted*".

20<sup>th</sup> Century sea level data with altimetry data from 1992-2012



From Meyssignac & Cazenave, (2012)

3/07/2014

5

## Assertion 3

# Sea levels in the Maldives fell 0.2-0.3 m prior to 2004.

The claim is based upon one interpretation of morphological and sedimentary records.

### Basic Errors

- The interpretation conflicts with met-ocean data datasets.
- Others have convincingly challenged Mörner et al's interpretation.
- Even if partly real, Mörner concedes that it can only be a regional effect (not global).

3/07/2014

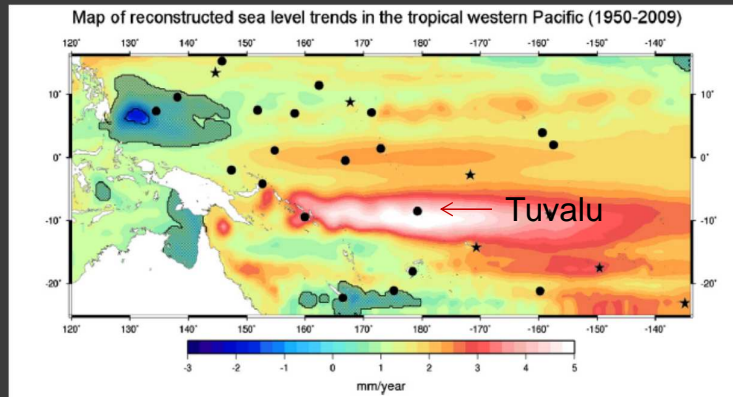
6

## Assertion 4

# No evidence of sea level rise at the Tavalu Island group

### Basic Errors

- The assertion is demonstrably incorrect.
- Even were he correct, active tectonic forces are ignored.



From Becker et al, 2012)

XXV International Federation of Surveyors  
Congress, Kuala Lumpur, Malaysia, 16 – 21 June  
2014

3/07/2014

7

# FUTURE SEA LEVEL CHANGE

Taken from IPCC 2013  
Relative to 1986-2005 baseline

		2046-2065		2081-2100	
	Scenario	Mean	Likely range	Mean	Likely range
Global Mean Sea Level Rise (m)	RCP2.6	0.24	0.17 to 0.32	0.40	0.26 to 0.55
	RCP4.5	0.26	0.19 to 0.33	0.47	0.32 to 0.63
	RCP6.0	0.25	0.18 to 0.32	0.48	0.33 to 0.63
	RCP8.5	0.30	0.22 to 0.38	0.63	0.45 to 0.82

Strict emissions mitigation

High emissions

XXV International Federation of Surveyors  
Congress, Kuala Lumpur, Malaysia, 16 – 21 June  
2014

3/07/2014

8

# CONCLUSIONS

- ⦿ Lord Monckton is demonstrably wrong in his assertions!
- ⦿ Global sea level rise is a reality. Best estimates indicate  $1.8 \pm 0.2$  mm/yr. in the 20<sup>th</sup> Century.
- ⦿ Satellite altimetry data suggest this rate has increased in the last two decades.
- ⦿ Plan for 0.2 – 0.8 m higher than present by 2100.