

A large, circular opening in a metallic tunnel, looking out onto a sunset over the ocean. The tunnel's interior is illuminated with a warm, golden light, and the ocean and sky are visible through the opening. The sky is filled with soft, colorful clouds, and the sun is setting on the horizon, casting a glow over the water. The ocean is calm, and a small island or headland is visible in the distance. The overall mood is serene and contemplative.

# Time to Failure for Infrastructure under Climate Change

Belinda Storey

20 September 2018

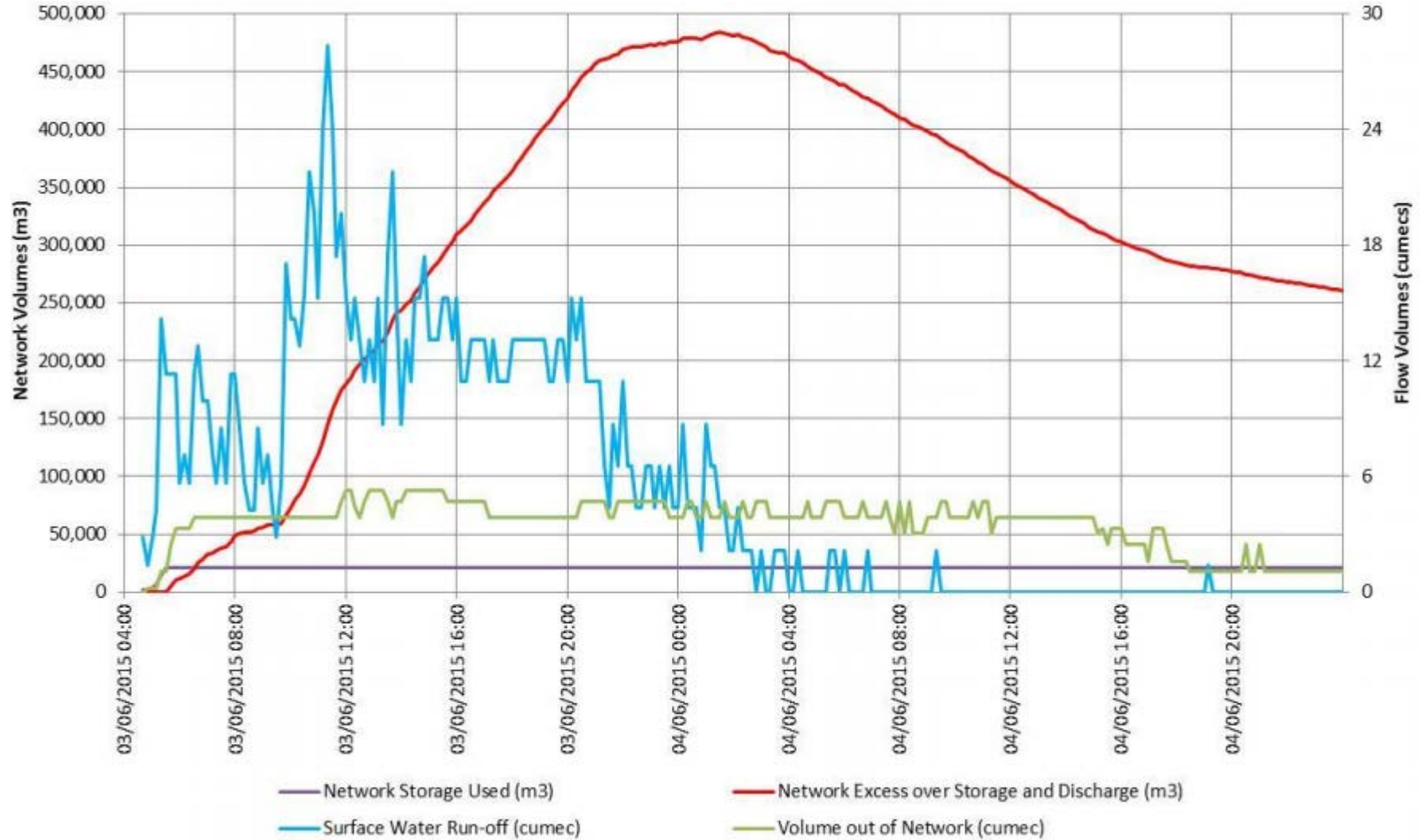


Princes Street, Dunedin



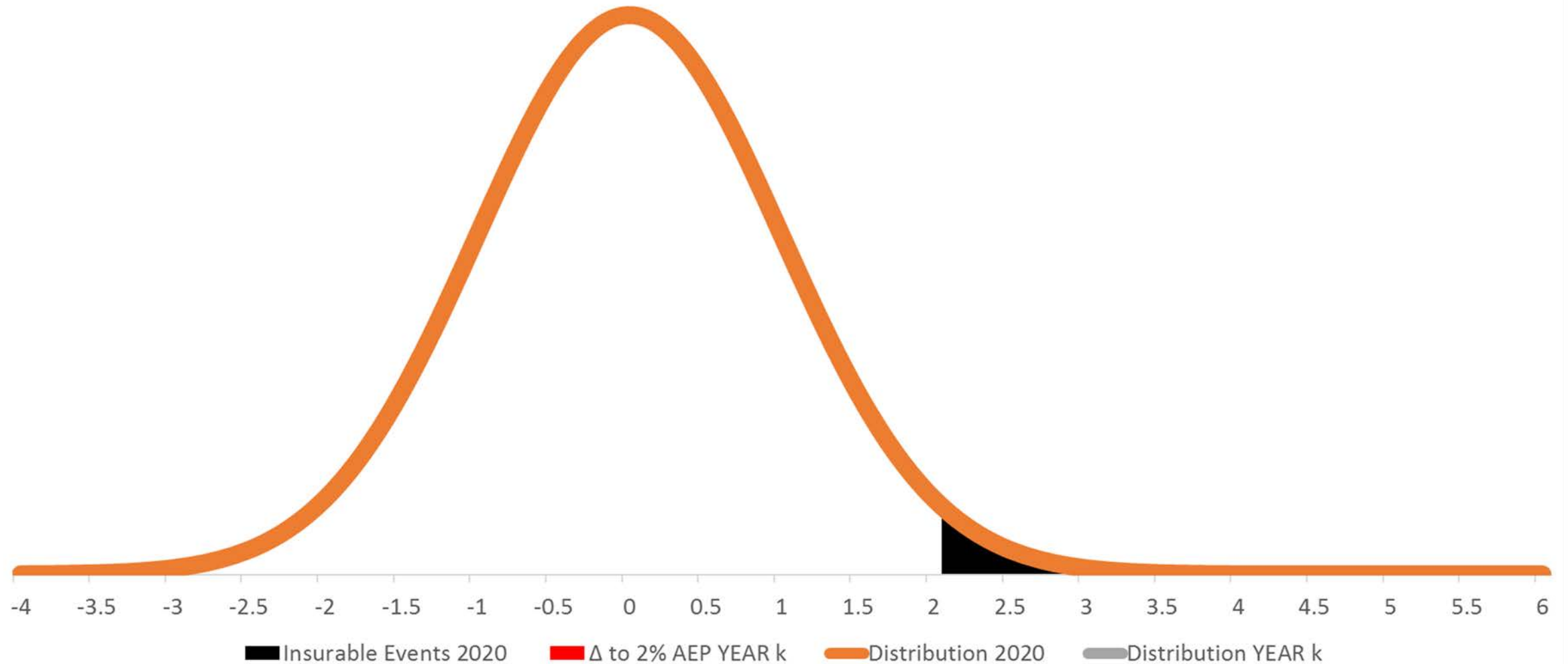
# Dunedin Rainfall Event 3rd / 4th June 2015

## Network Performance




# Climate Change Is Shifting Distributions

Temperature, Sea Level, Precipitation, Storm Surge...







# Insurance Retreat Thresholds

Annual Exceedance Probability

(A.E.P.)

1.32%

2.00%

3.92%

4.88%

Recurrence Interval

(R.I.)

1 in 75 years

1 in 50 years

1 in 25 years

1 in 20 years

Sydney, Australia June 2016



Hurricane Harvey, August 2017  
PHOTO: U.S.A. Army

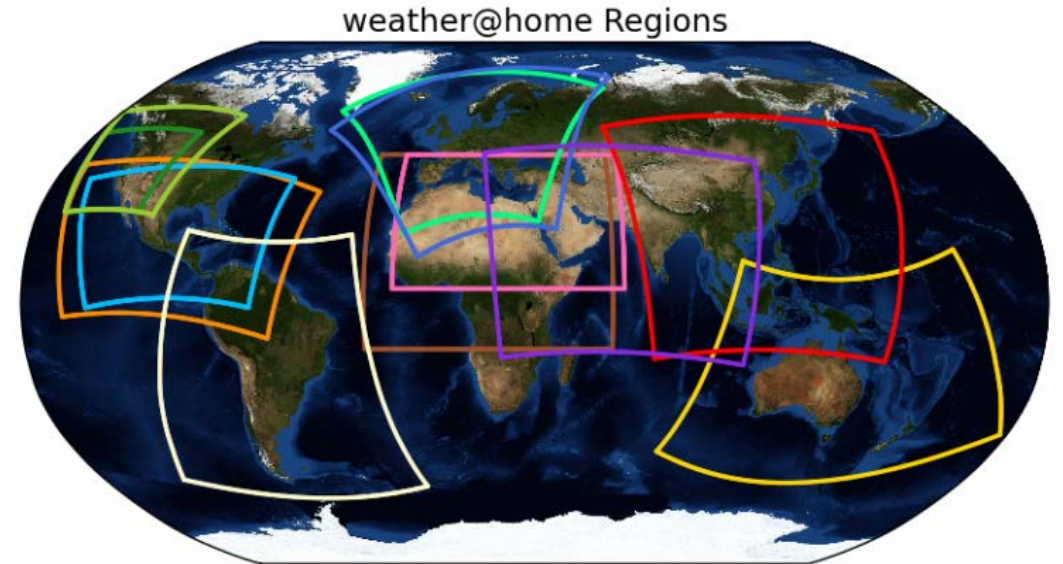
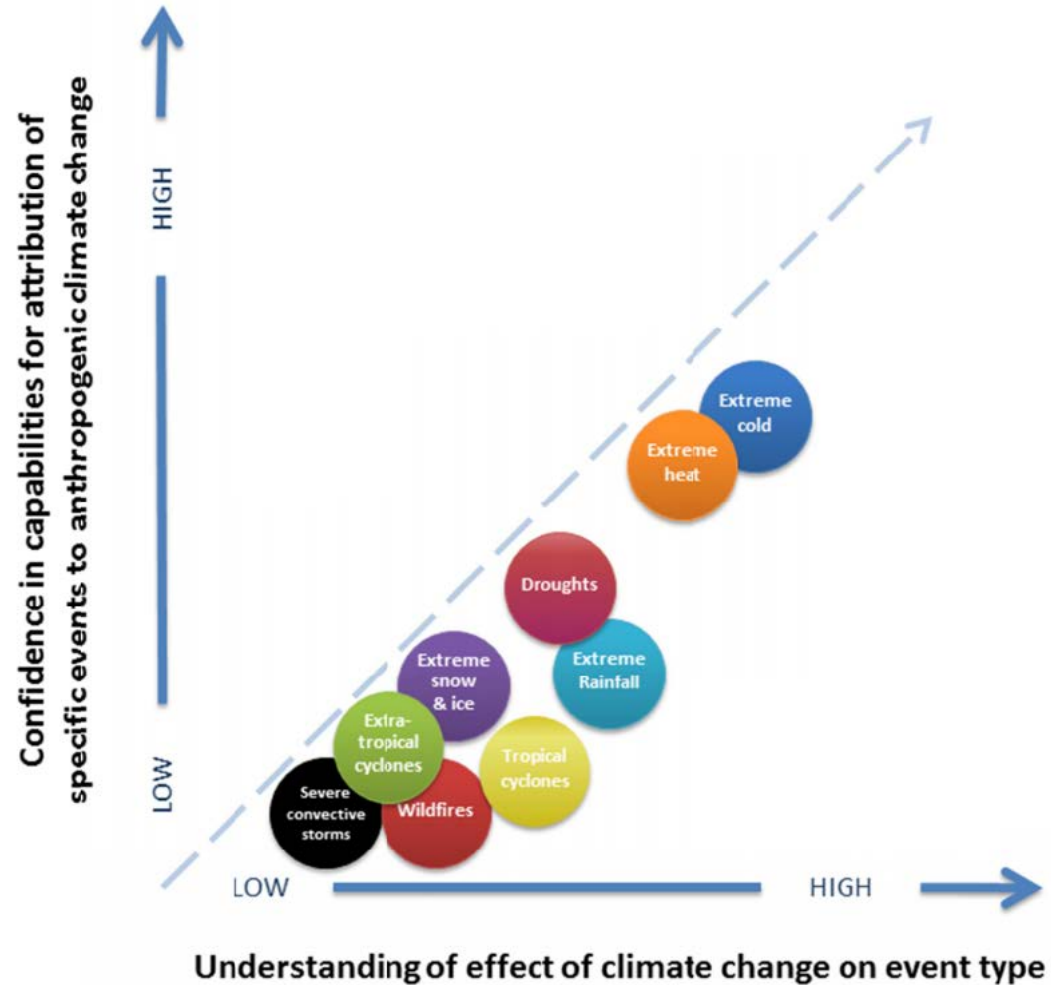




CRAY  
CS500



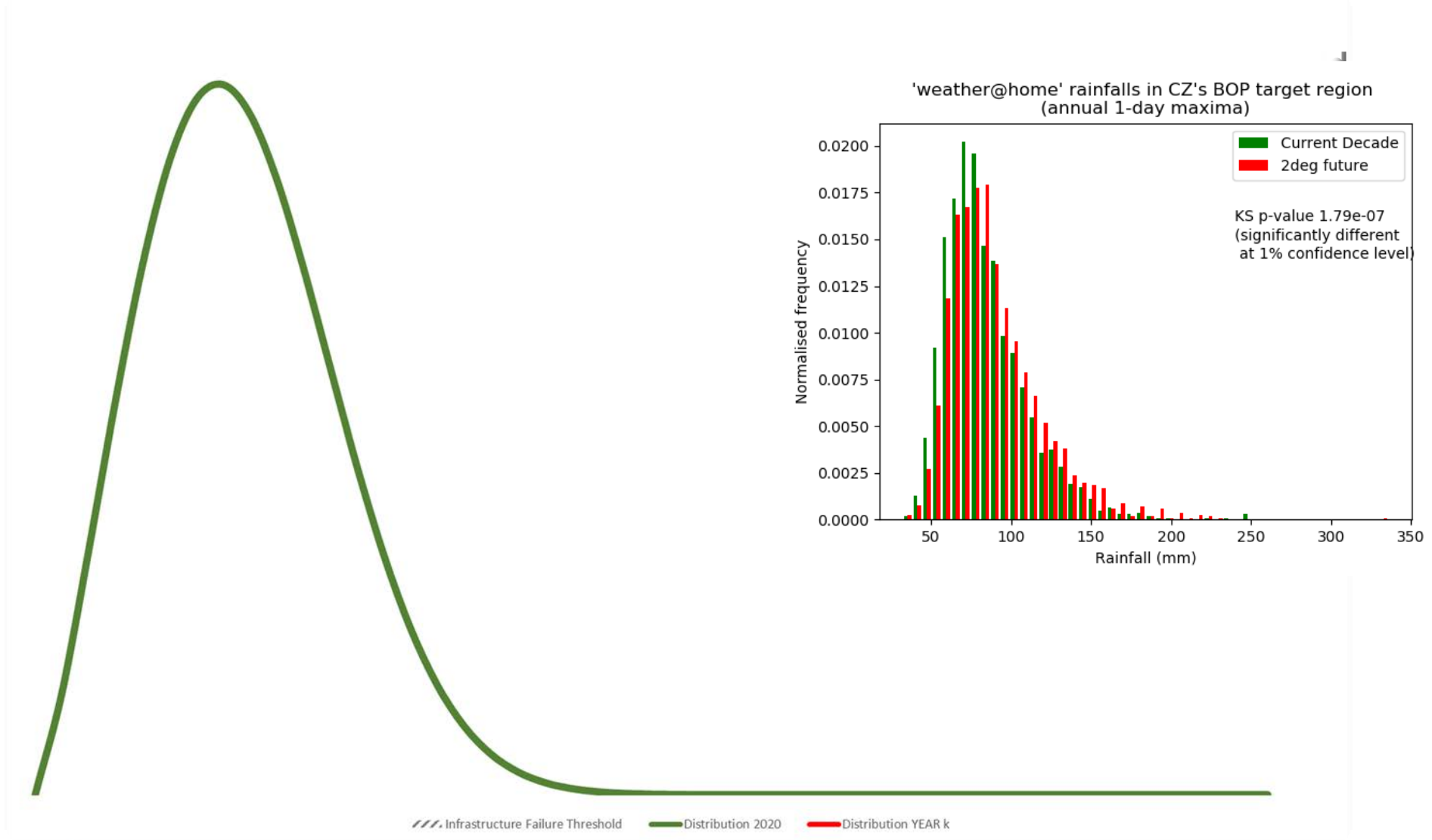
# Confidence in Modelling of Extremes



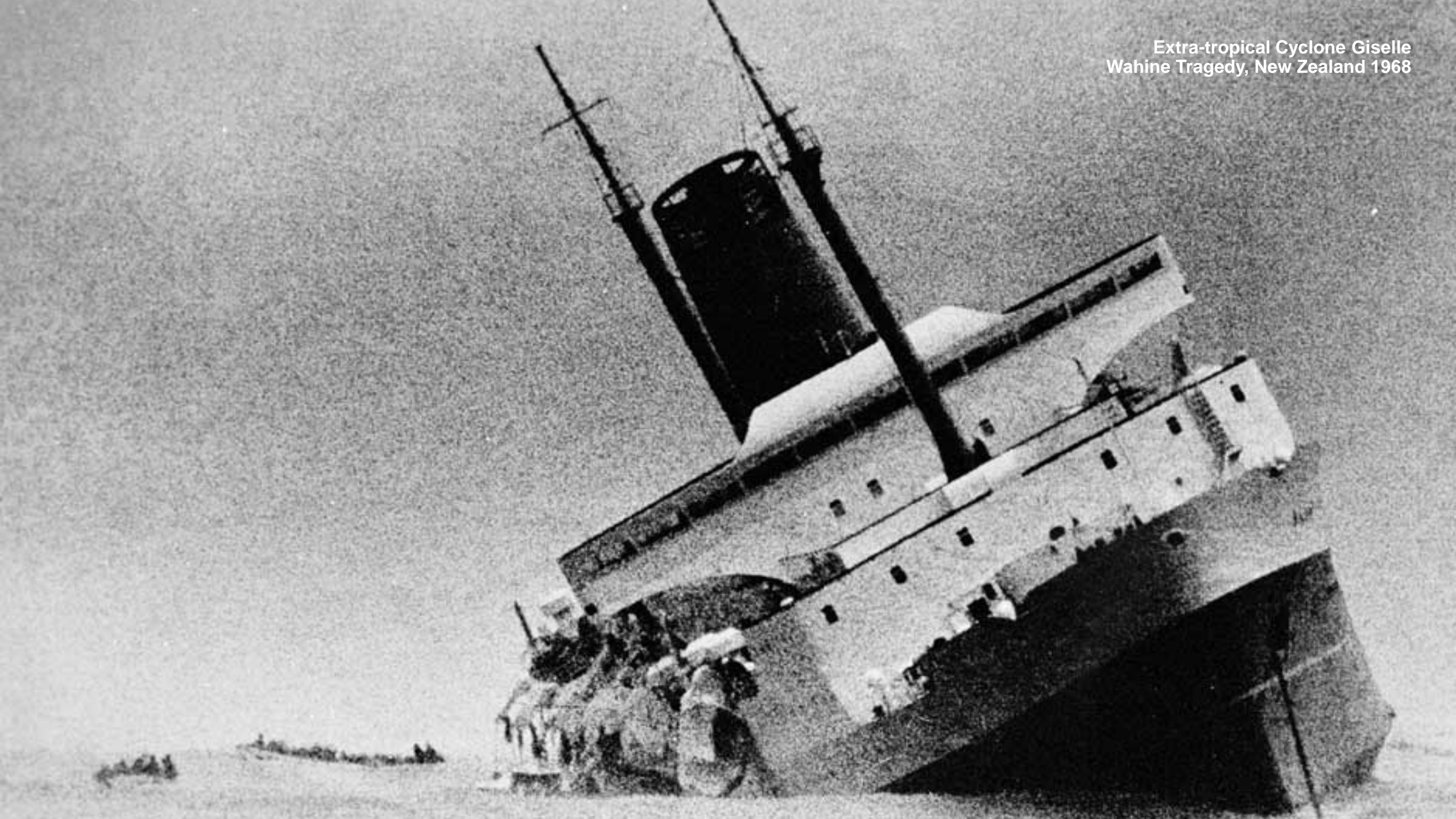


# Precipitation Distribution: Illustration Only

## Extraordinary Change in Extreme Despite Negligible Change in Mean



Extra-tropical Cyclone Giselle  
Wahine Tragedy, New Zealand 1968





A circular opening in a metallic tunnel, possibly a submarine or a large pipe, looking out at a sunset over the ocean. The tunnel's interior is illuminated by the warm, golden light of the setting sun, creating a strong contrast with the dark, shadowed areas. The ocean is visible through the opening, with a small island or headland in the distance under a sky filled with soft, colorful clouds. The overall mood is contemplative and serene.

**QUESTIONS?**