



# The Ever-changing Life of a Particle

**Elizabeth Somervell**

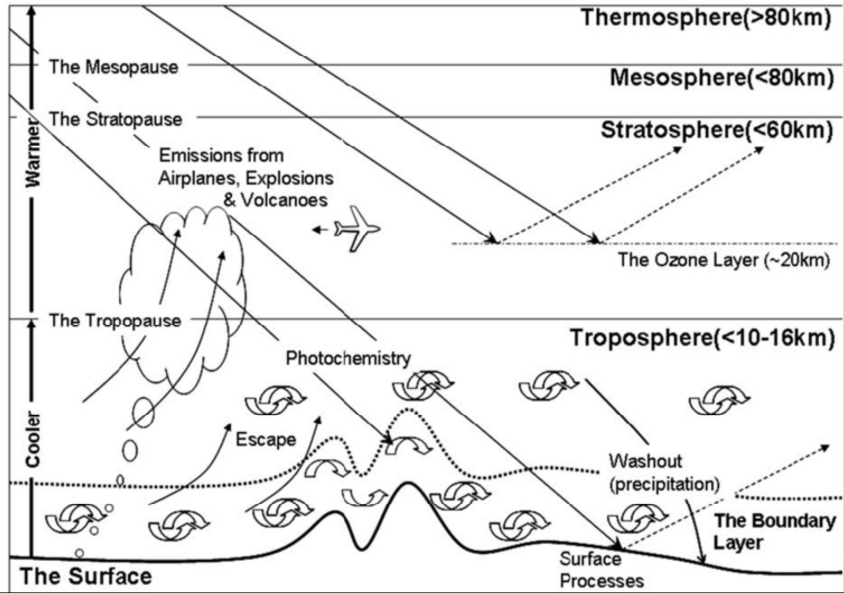
National Institute of Water & Atmospheric Research  
Auckland, New Zealand





# The Ever-changing Life of a Particle

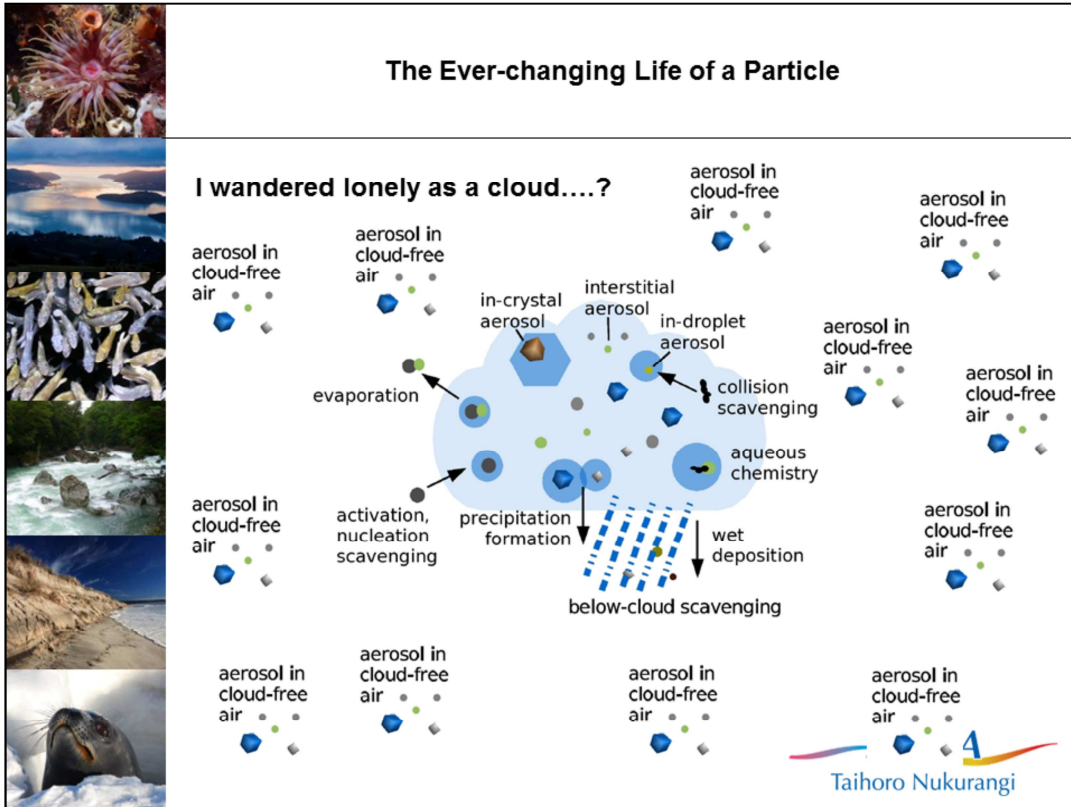
Where are we?



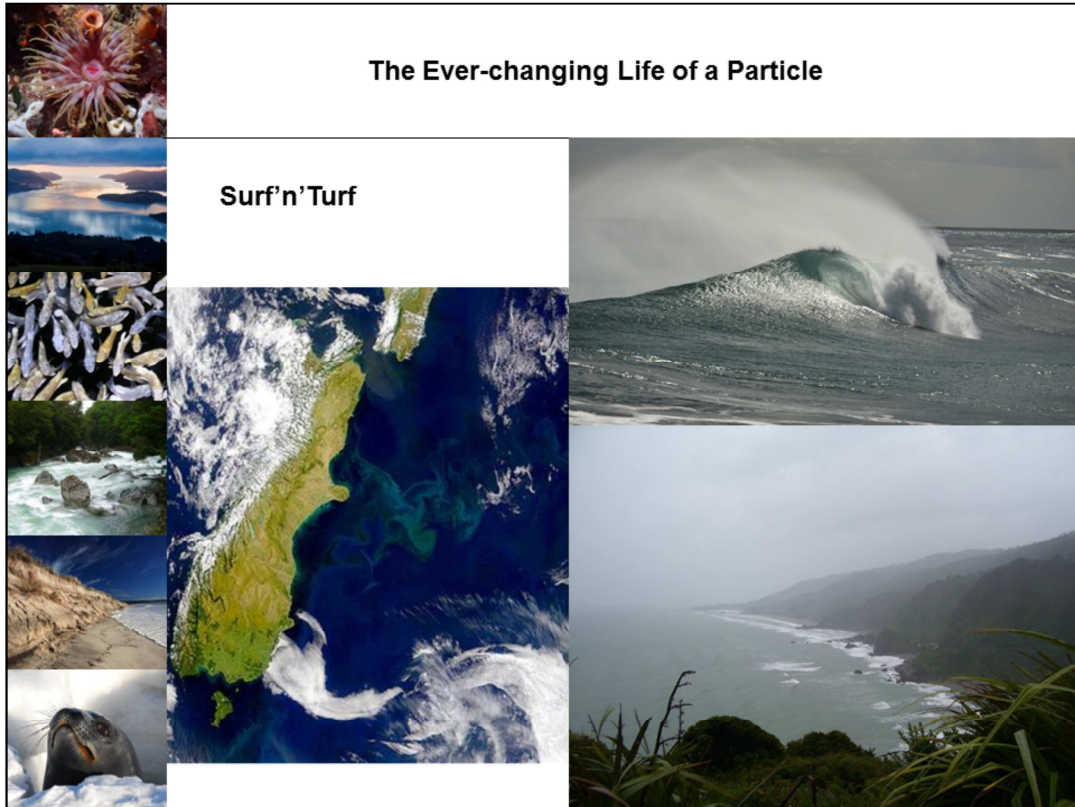
## The Ever-changing Life of a Particle

I wandered lonely as a cloud....?

Lots of processes involved in clouds, but also in free atmosphere



‘Clean’ air is still full of aerosols



## The Ever-changing Life of a Particle

### Surf'n'Turf

When an air mass meets land, changes in: altitude, radiative fluxes,  
Pushed upwards - cools etc

|  |   |
|--|---|
|  | <b>The Ever-changing Life of a Particle</b> |
|  | <b>Trees!</b>                               |
|  |   |
|  |   |
|  |   |
|  |   |

Biogenic emissions i.e., Isoprene, terpenes, a-pinene. From volatile to large enough to not vapourise at all

Megan model-147 compounds

Master Chemical Mechanism (MCM model) uses 6700 of primary, secondary and radical species. 248 categories of VOCs

Just south of this photo of the Waitakere Ranges is agricultural land – different physically and emissions

## The Ever-changing Life of a Particle

### Bright Lights, Big City

- Emissions

- Turbulence

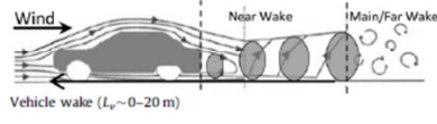
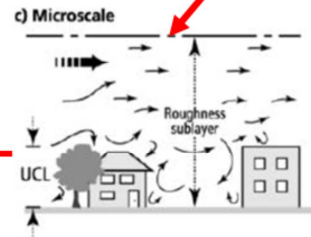
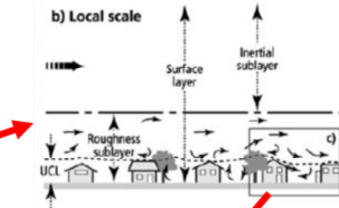
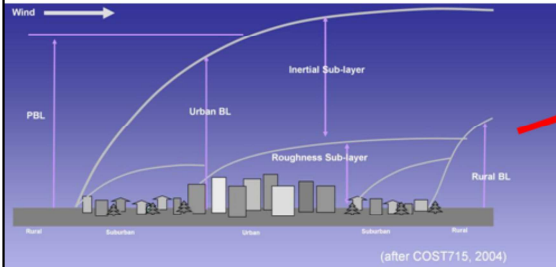
- Climate



Cities vary widely in building materials, physical construction and geometry  
emissions, terrain and geography

# The Ever-changing Life of a Particle

## Bright Lights, Big City (Turbulence)



enhancing the benefits of New Zealand's natural resources



Aerosol always in a turbulent environment



## The Ever-changing Life of a Particle

### Bright Lights, Big City (Climate)



enhancing the benefits of New Zealand's natural resources

**NIWA**  
Taihoro Nukurangi


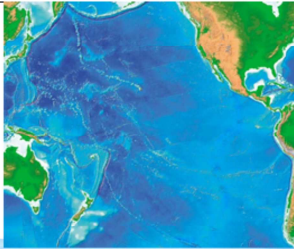

Heat of the day or UHI at night. Invert it and it's 10am, when the urban fabric is cooler than the surrounding rural and still soaking in heat.

Mosaic of heat and moisture sinks and dry baked concrete

**The Ever-changing Life of a Particle**

**So Long, Farewell....**

- Back to the beginning



The image is a composite slide. At the top, the title "The Ever-changing Life of a Particle" is centered. Below it, the text "So Long, Farewell...." is followed by a bullet point "• Back to the beginning". The slide features several images: a vertical strip on the left with five small images (sea anemone, sunset, driftwood, waves, and a seal); a large aerial photograph of a coastal city and bay; and a map of the Pacific Ocean in the top right corner.

Back off out to sea to interact with marine aerosol