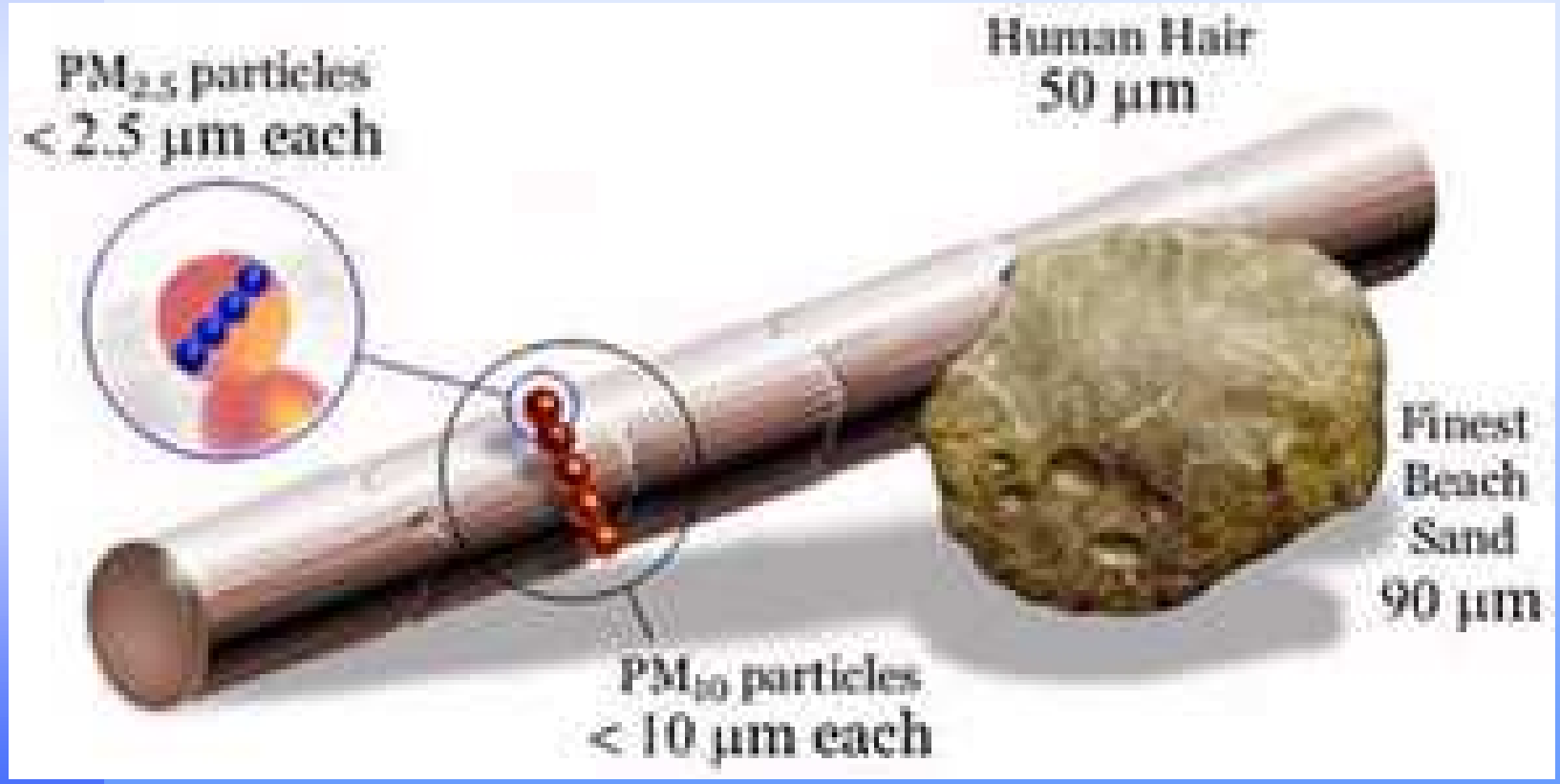
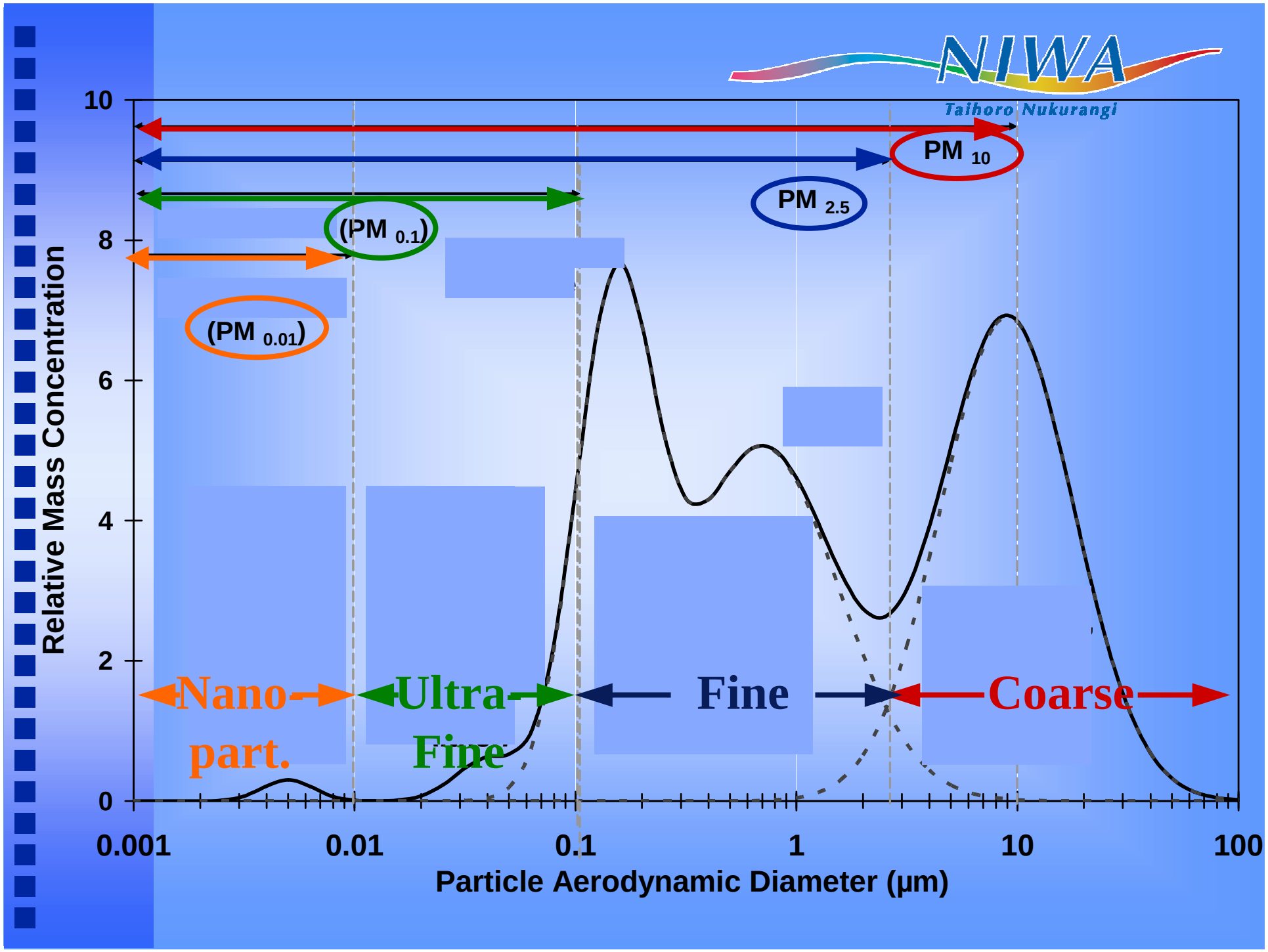
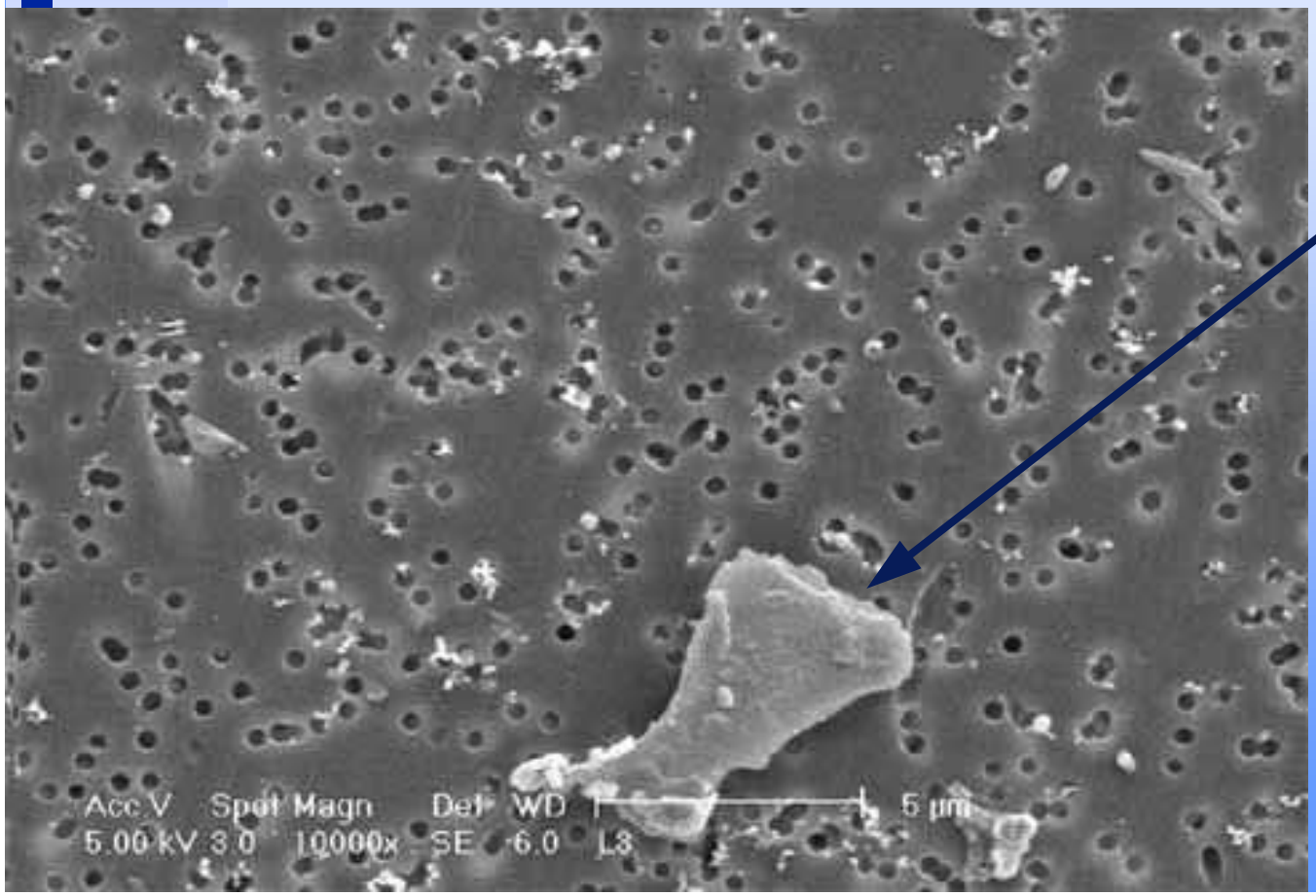
$PM_{2.5}$ in Urban NZ:
Section 3.2




NIWA
Taihoro Nukurangi
Relative Mass Concentration
10
8
6
4
2
0
PM 10
PM 2.5
(PM 0.1)
(PM 0.01)
Nano-part.
Ultra Fine
Fine
Coarse
0.001
0.01
0.1
1
10
100
Particle Aerodynamic Diameter (µm)

Sources $PM_{10-2.5}$

- Mechanical sources such as dusty roads, soil tiling, bulk handling and quarries.

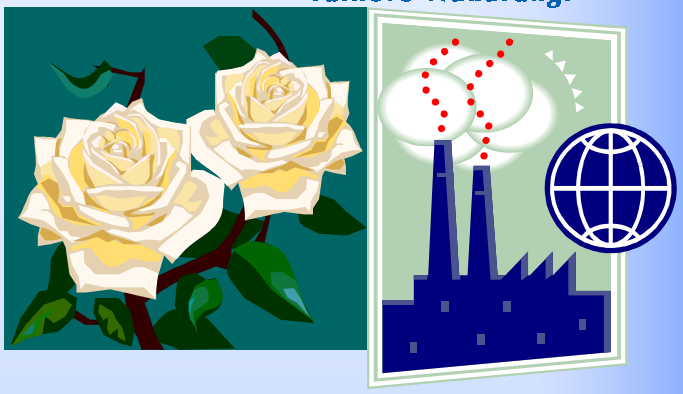


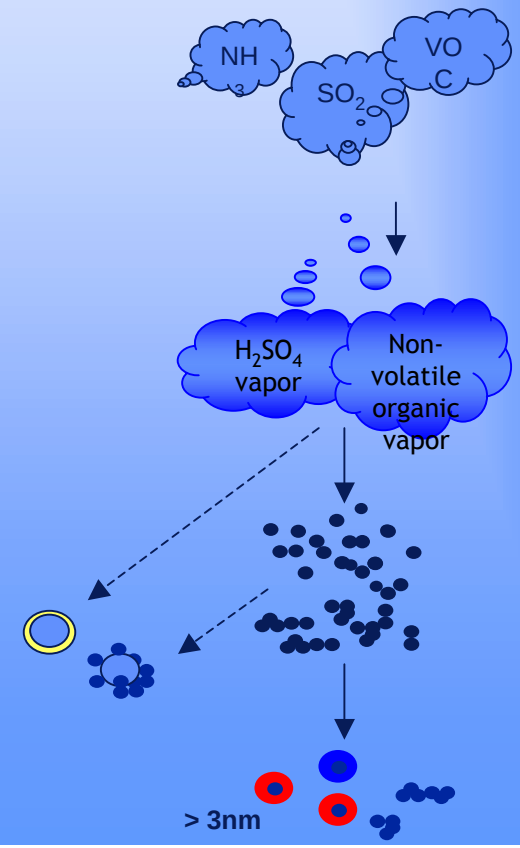
Roadside PM_{10}, polycarbonate filter, Christchurch, February 2003

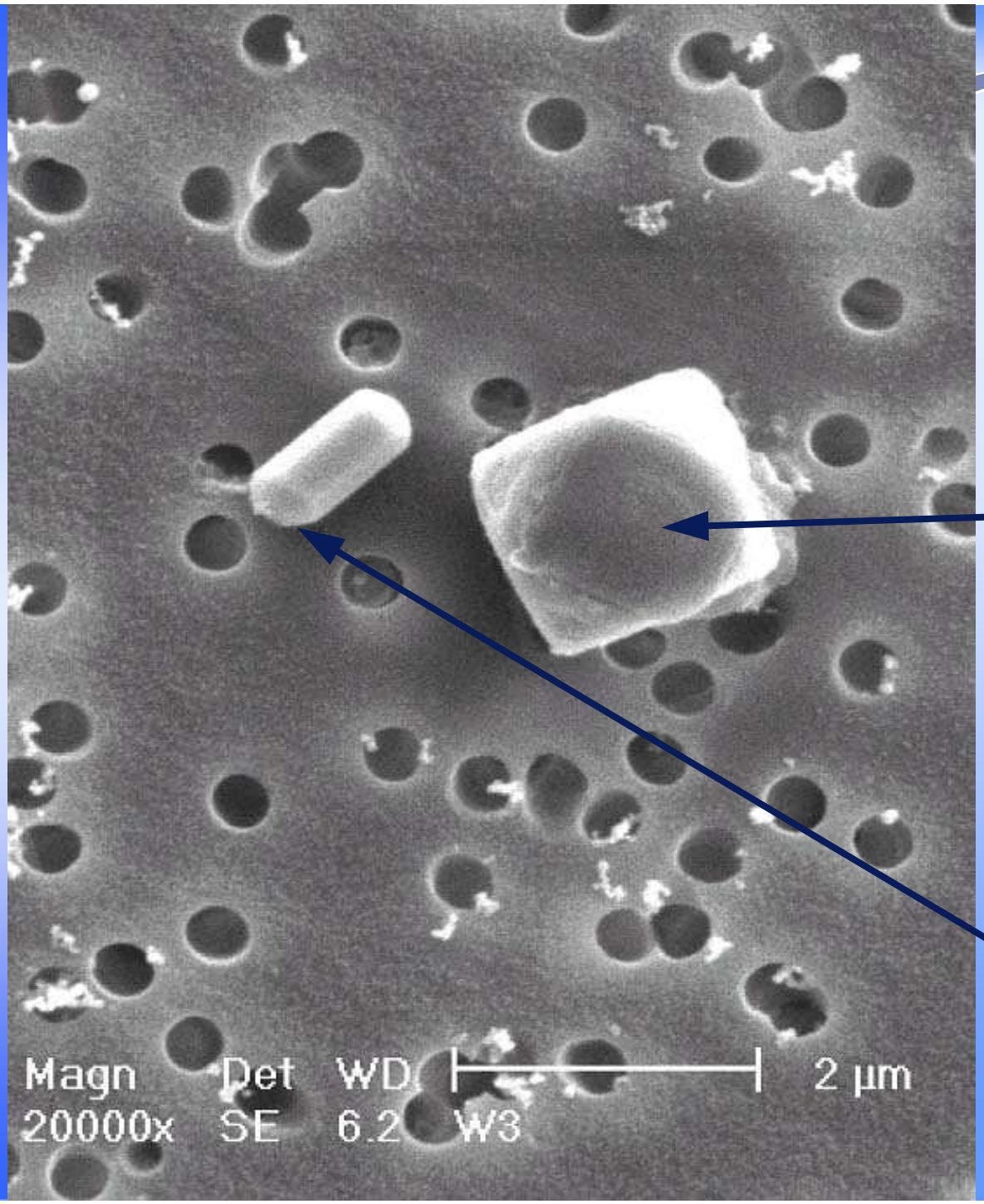
David Shooter, AU

Sources $PM_{2.5}$

- Primary
  - Burning fuel, transportation, industrial processes and some natural sources.
- Secondary
  - Chemical reactions in the atmosphere.







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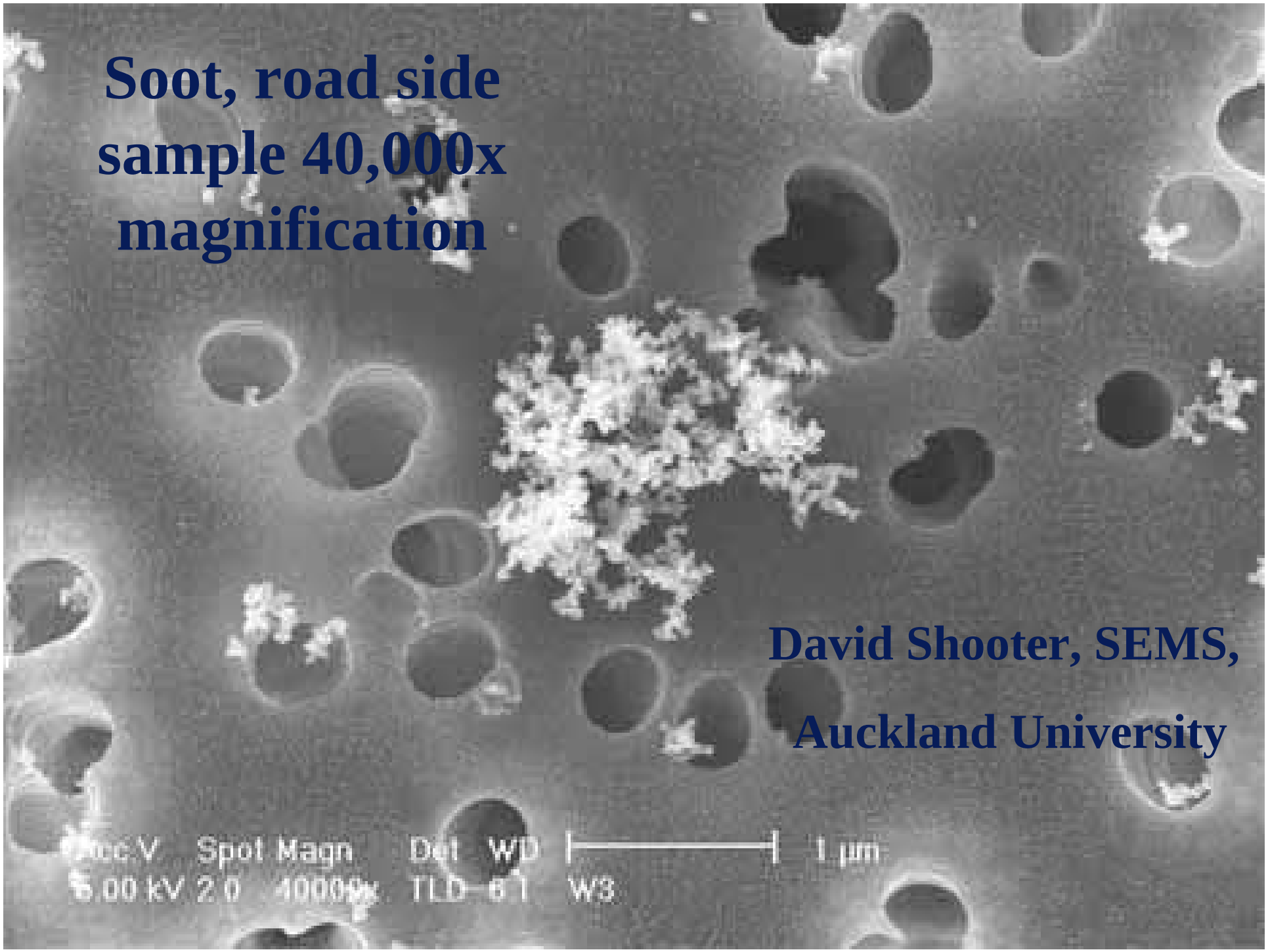
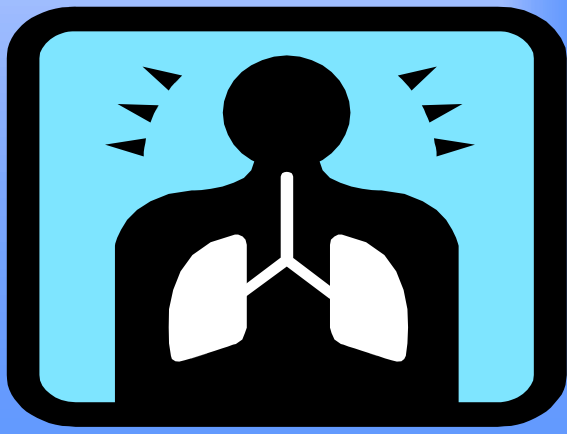
Salt

Pollen


Soot, road side sample 40,000x magnification
David Shooter, SEMS,
Auckland University
Acc.V Spot Magn Det WD 1 µm
5.00 kV 2.0 40000x TLD-B 1 W3

Human Health and PM

- Correlation between exposure to particles and adverse health effects
- Generally association stronger between $PM_{2.5}$ than PM_{10}
  - $PM_{2.5}$ penetrates deeper into the lungs
  - Active component of particulate matter resides mostly in $PM_{2.5}$



International Context

Australia:

Monitor and Report

USA:

65 µg/m^3

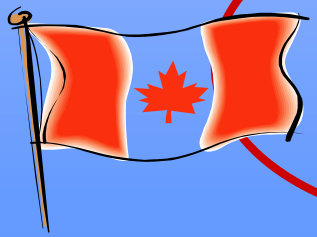
EU

Recommended

35 µg/m^3

$PM_{2.5}$ Standard

UK: “Highly Desirable” - Expert Panel

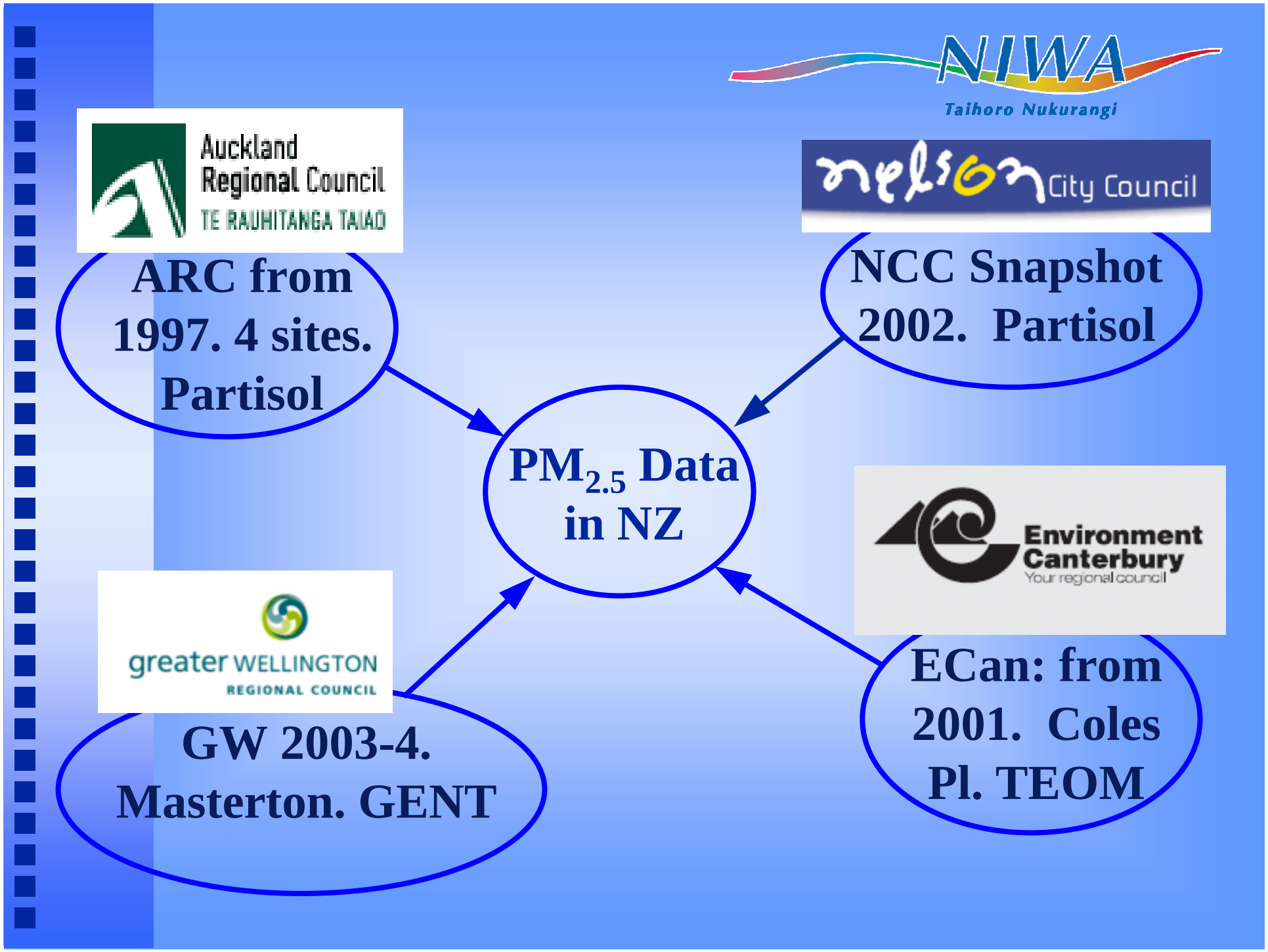


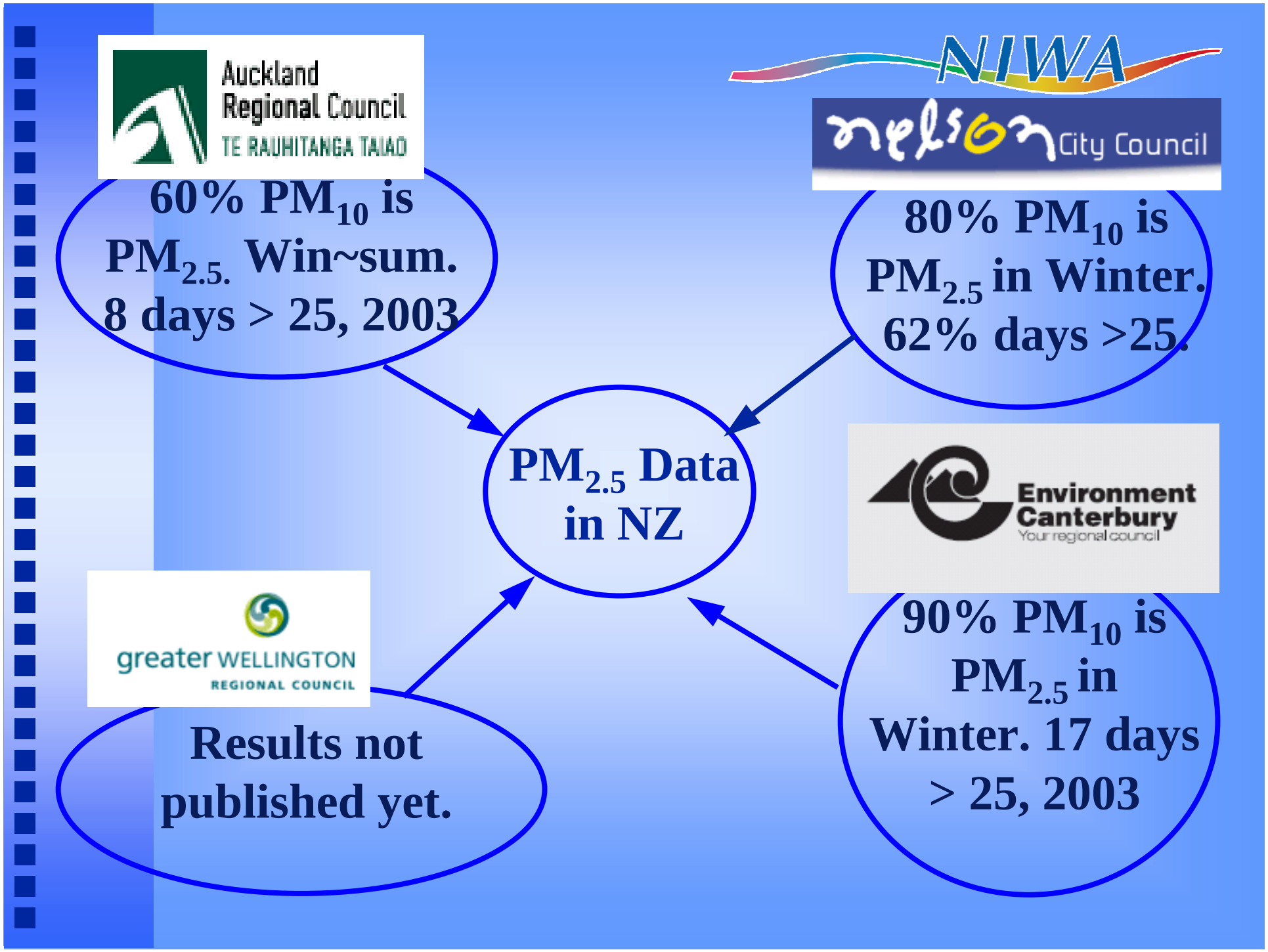
Canada:

30 µg/m^3

New Zealand, No Standard. But Ambient Air Quality Guidelines (MfE 2002) note that:

- *$PM_{2.5}$ may be responsible for specific health effects caused by fine particulates*
- *Need to increase our understanding of $PM_{2.5}$*
- *"Monitoring Value" of 25 μgm^{-3} (24-hr)*
- *To promote $PM_{2.5}$ monitoring and assessment.*


NIWA
Taihoro Nukurangi
Auckland Regional Council
TE RAUHITANGA TAIAO
nelson City Council
ARC from 1997. 4 sites. Partisol
NCC Snapshot 2002. Partisol
PM2.5 Data in NZ
Environment Canterbury
Your regional council
greater WELLINGTON
REGIONAL COUNCIL
GW 2003-4. Masterton. GENT
ECan: from 2001. Coles Pl. TEOM


Auckland Regional Council
TE RAUHITANGA TAIAO
NIWA
nelson City Council
60% PM_{10} is $PM_{2.5}$. Win~sum. 8 days > 25, 2003
80% PM_{10} is $PM_{2.5}$ in Winter. 62% days >25.
$PM_{2.5}$ Data in NZ
Environment Canterbury
Your regional council
greater WELLINGTON
REGIONAL COUNCIL
Results not published yet.
90% PM_{10} is $PM_{2.5}$ in Winter. 17 days > 25, 2003

The Way Forward?

- Invest time and/or resources into a nationwide study that:
  - Quantifies $PM_{10}/PM_{2.5}$ relationship
  - Explores regional differences
  - Explores seasonal differences
  - Reviews methods used to monitor $PM_{2.5}$
  - Reviews the $PM_{2.5}$ monitoring network
  - Attempts to identify sources

Options to consider

- Review Outcomes of RC Programmes
  - Desktop and passive
- Collaborative Study
  - Aim to analyse all NZ data in usefully and in a nationally consistent manner
  - Working Group with Stakeholders
  - Access to the data – an issue
  - Report findings and make recommendations
- FRST Standalone Study
  - Field campaigns to provide data desired outcomes to be achieved.