

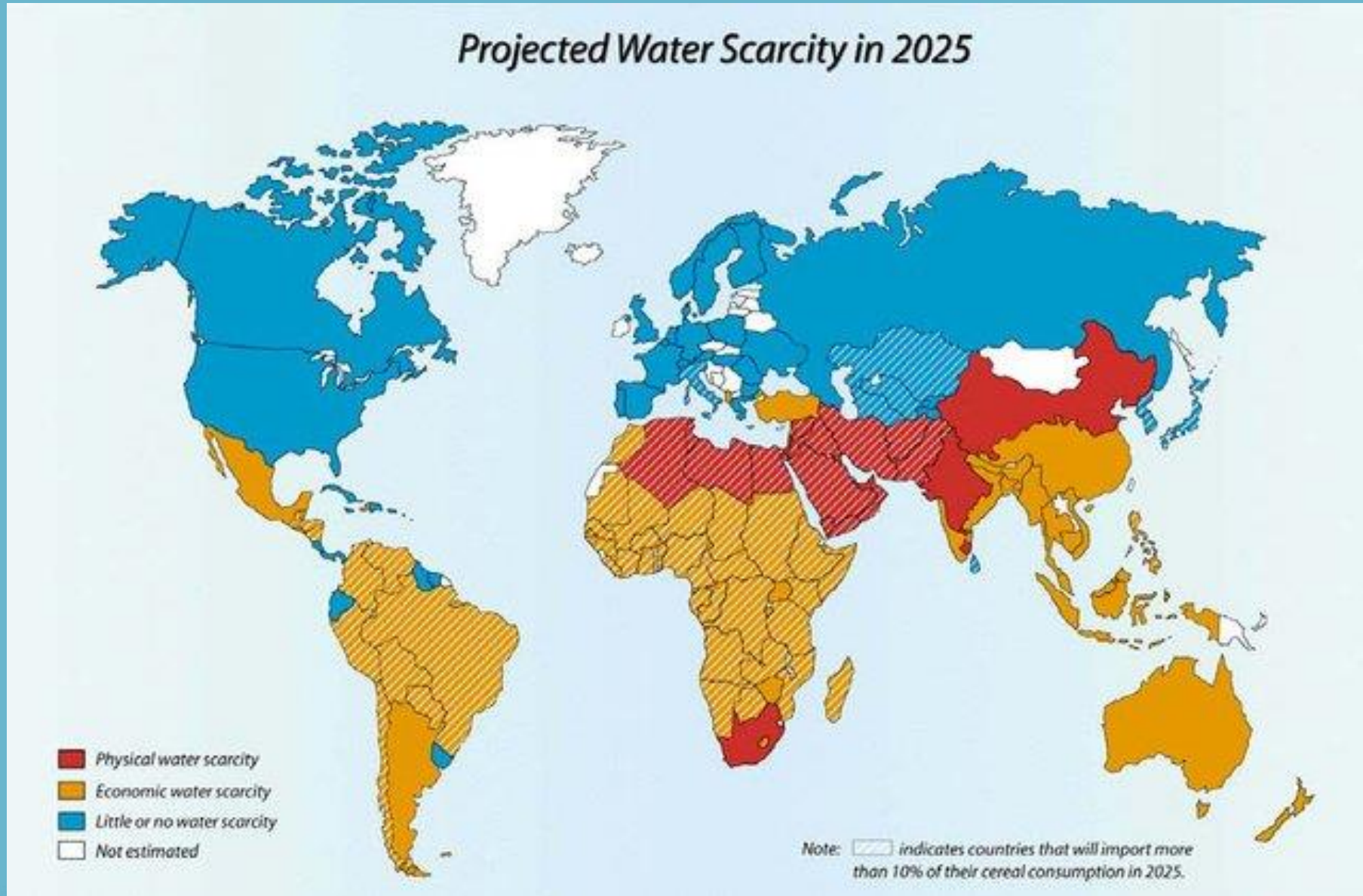
Innovative Solutions to Tackle Water Scarcity

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The challenge



Water Scarcity – It's complicated

Management & policy

- Regulating water usage activities
- Water pricing

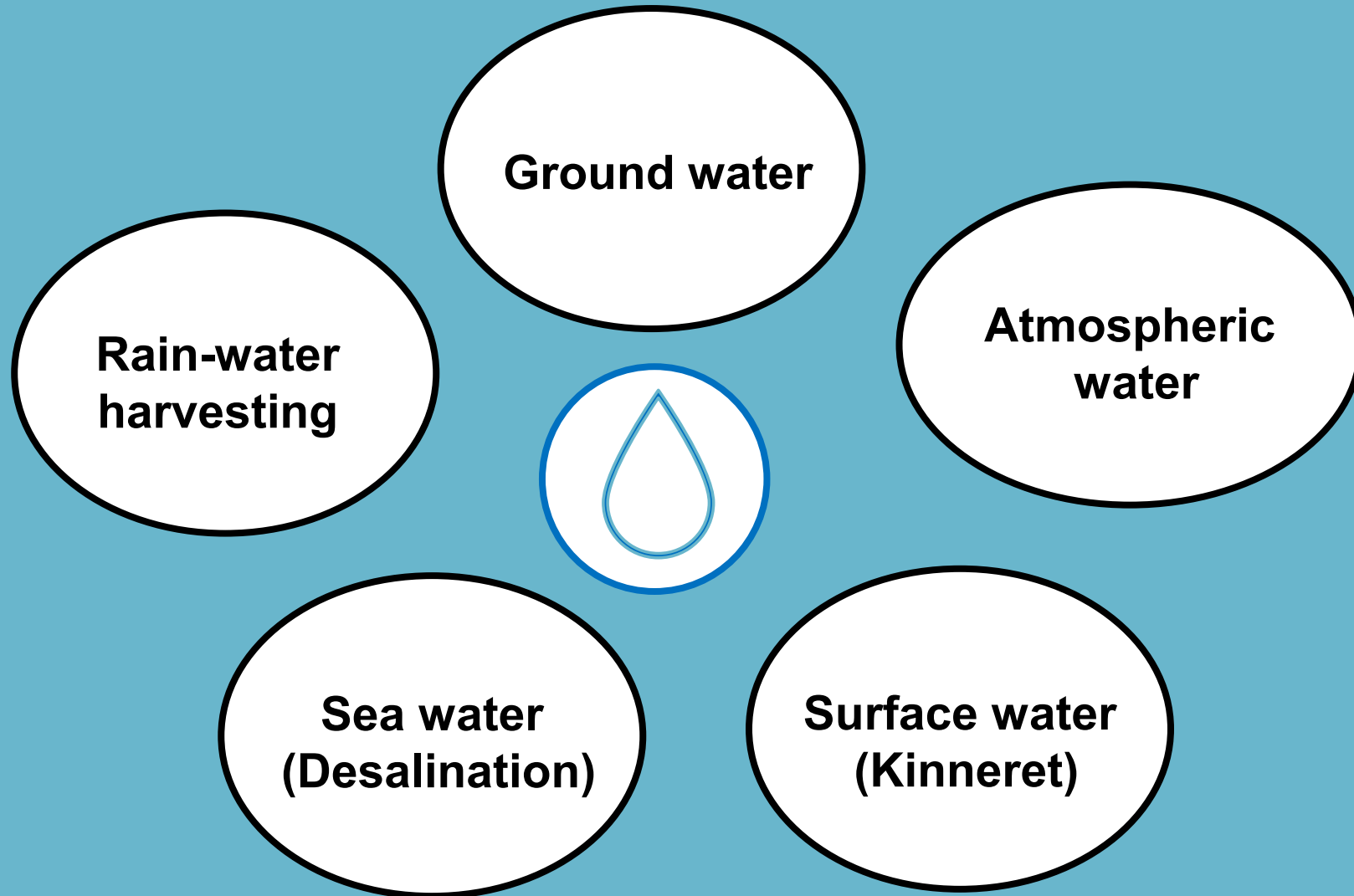
Education

- Water saving campaign
- Domestic water reserve

Technology

- Increasing water supply and infrastructure
- Improve existing water technologies
- Find new alternative solutions

Drinking Water Resources



Desalination

- Large saline water source
- Large capital Investments for building the desalination plant

Not relevant

to poor and noncoastal regions
(most of the countries that suffer from severe water scarcity)



Atmospheric Water

- A huge and renewable water resource (12,900 billion tons of fresh water)
- No need to build water transport infrastructure since the harvesting apparatus can be placed almost anywhere

relevant

to poor and noncoastal regions



Atmospheric Water Condensers

Passive condensers



Active condensers



5000 liters, like aircon, 15% RH + 10 degrees, 20 agorot,, cools vapor d.p

Research goals

1

Determine water quality (without any air/water filtration systems and water treatment technologies)

2

Expand the range of chemicals analyzed in atmospheric water

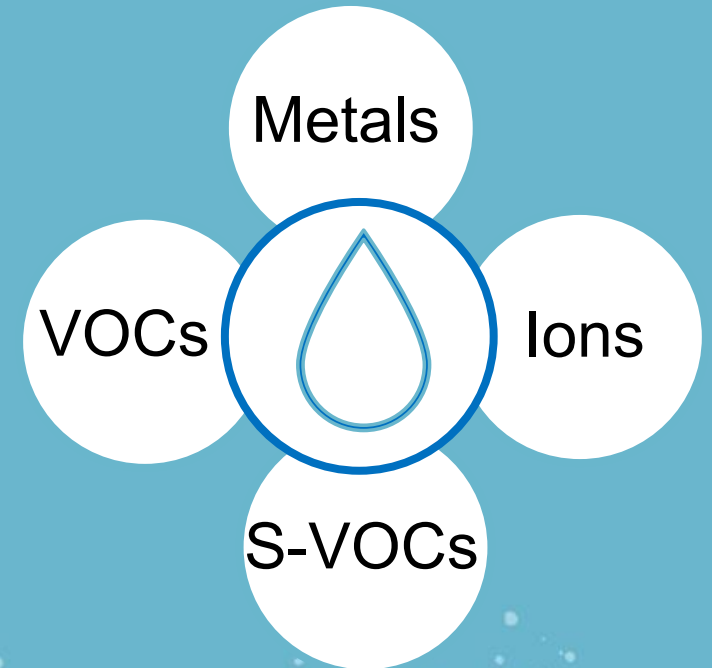
3

Air-water interactions: The signature of meteorological and air-quality parameters on the chemical profile of water produced from the atmosphere

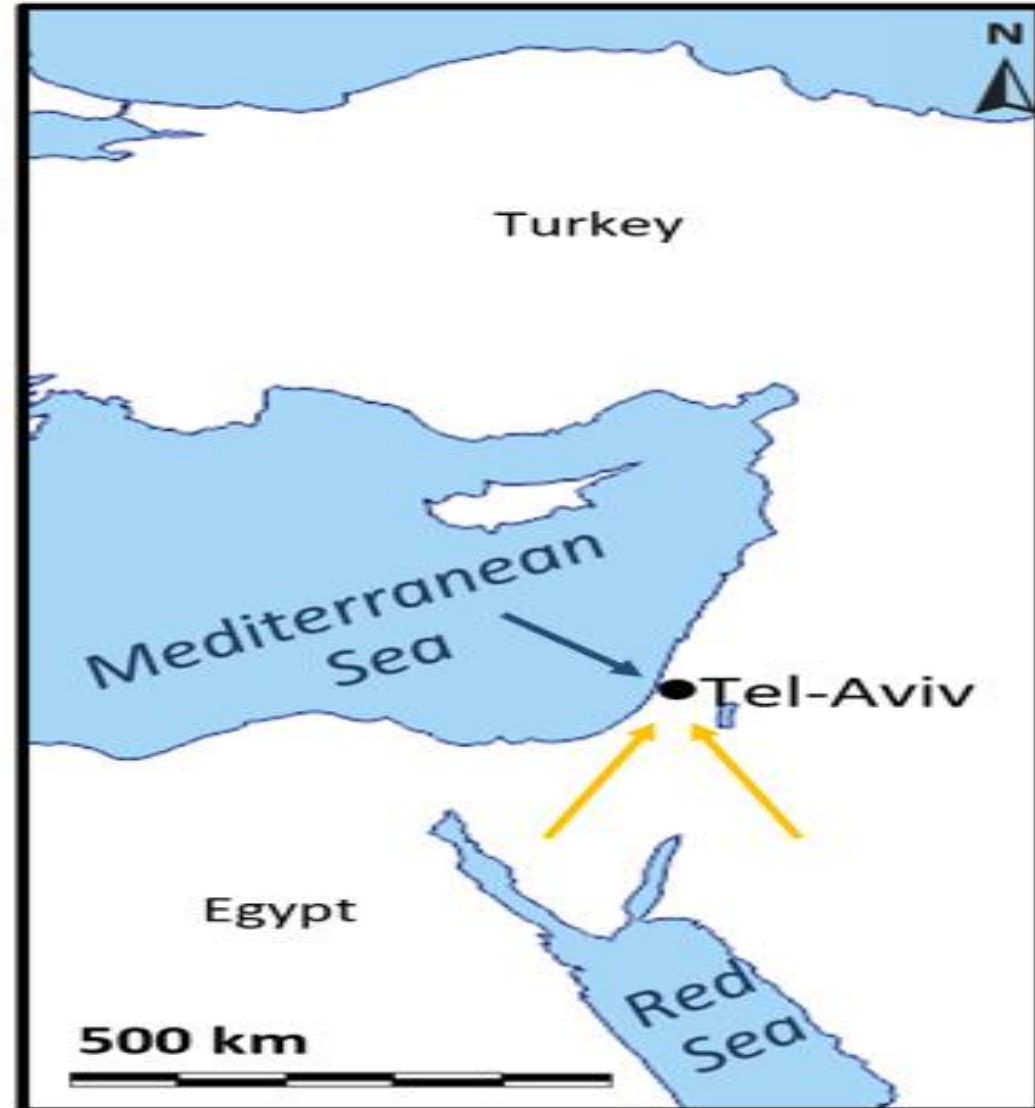


Water quality meets drinking water standards

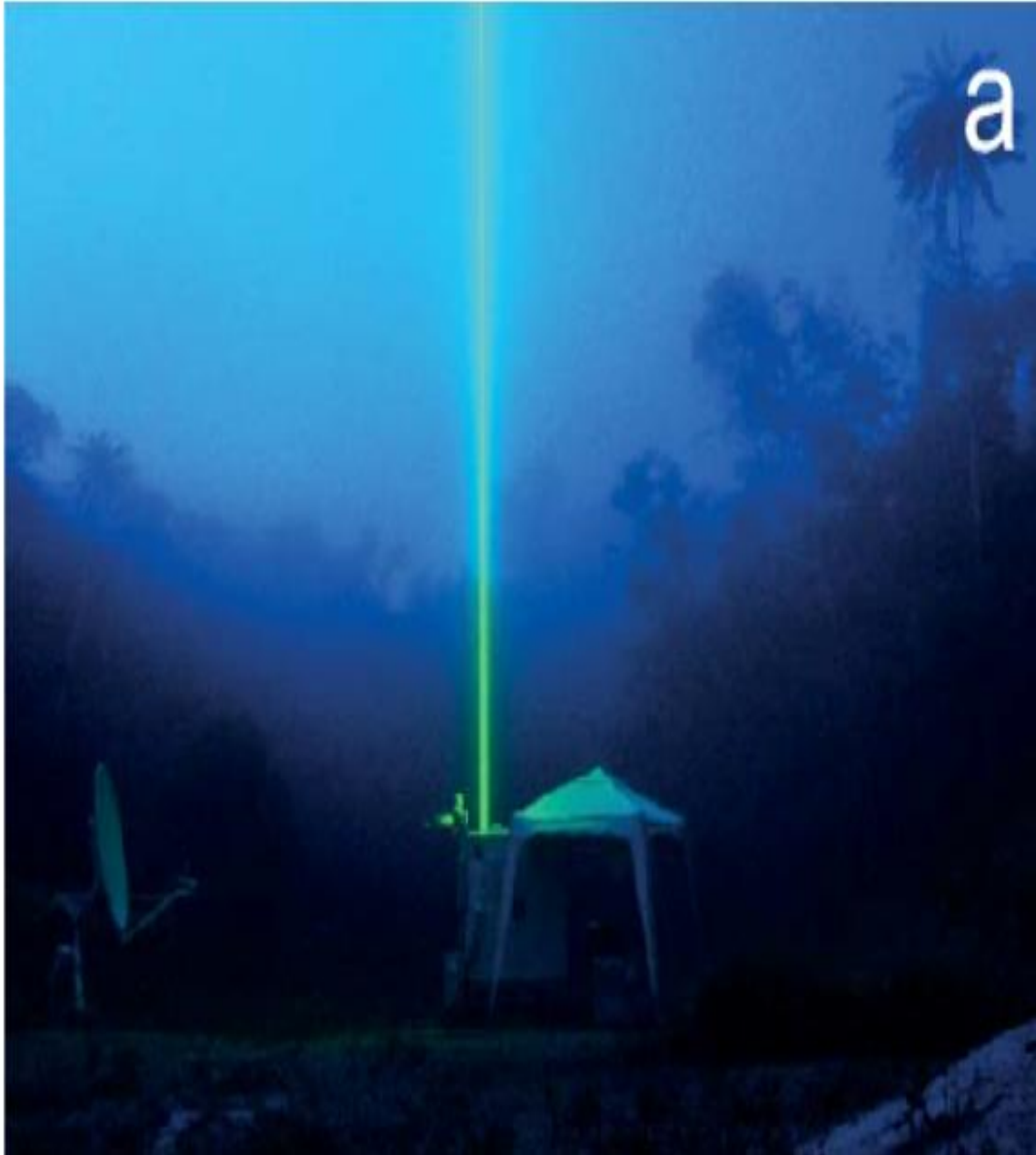
- The bottom line, none of the parameters studied (except Ni and Benzo[a]pyrene) have ever exceeded drinking water standards
- Deficiency in Calcium and Magnesium
- The AWG can produce potable water 24 h a day
- Although below the standard, large variation in water composition between different days and seasons



Regional source of aerosols and atmospheric water chemical profile



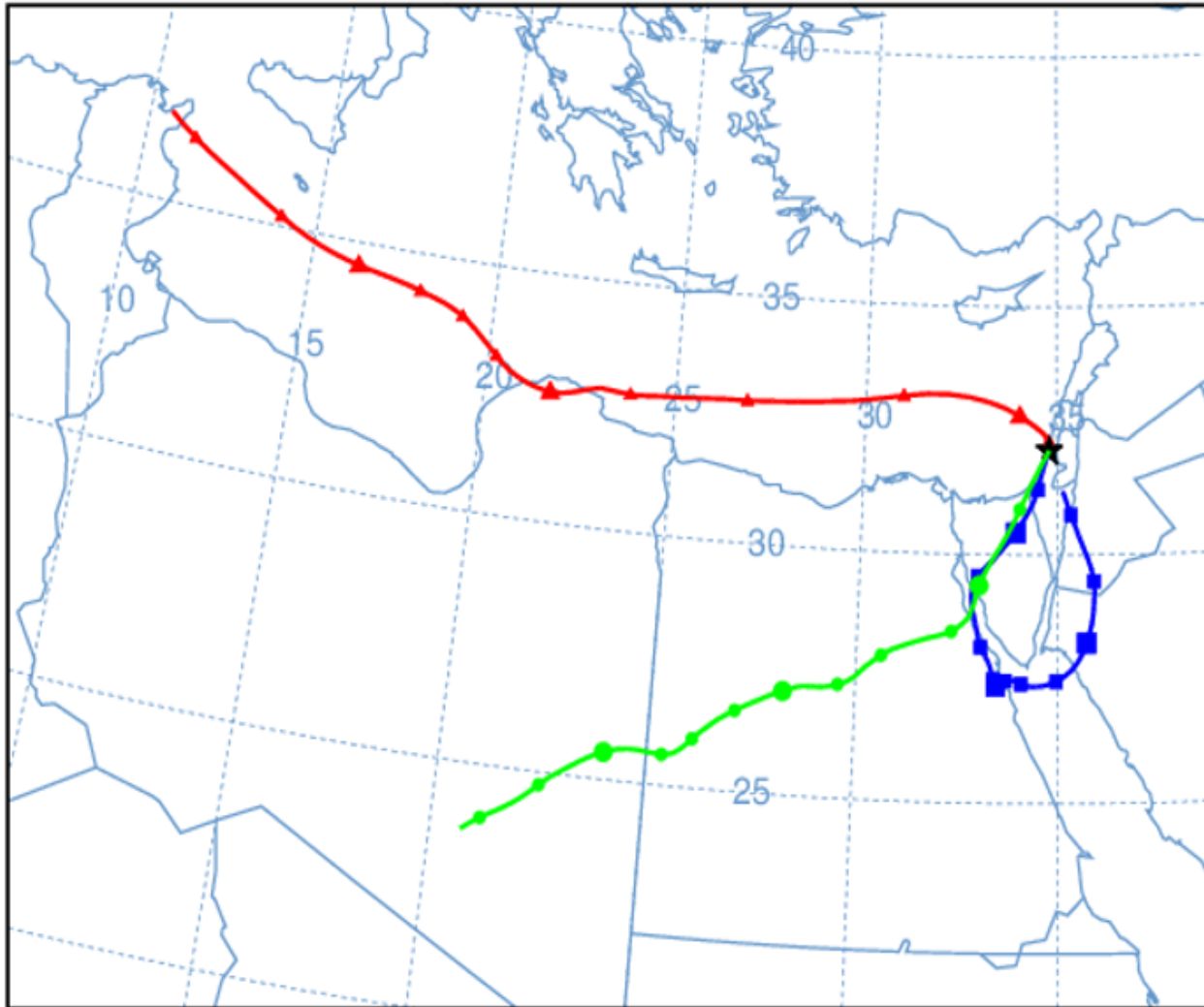
Lidar Polly^{XT}



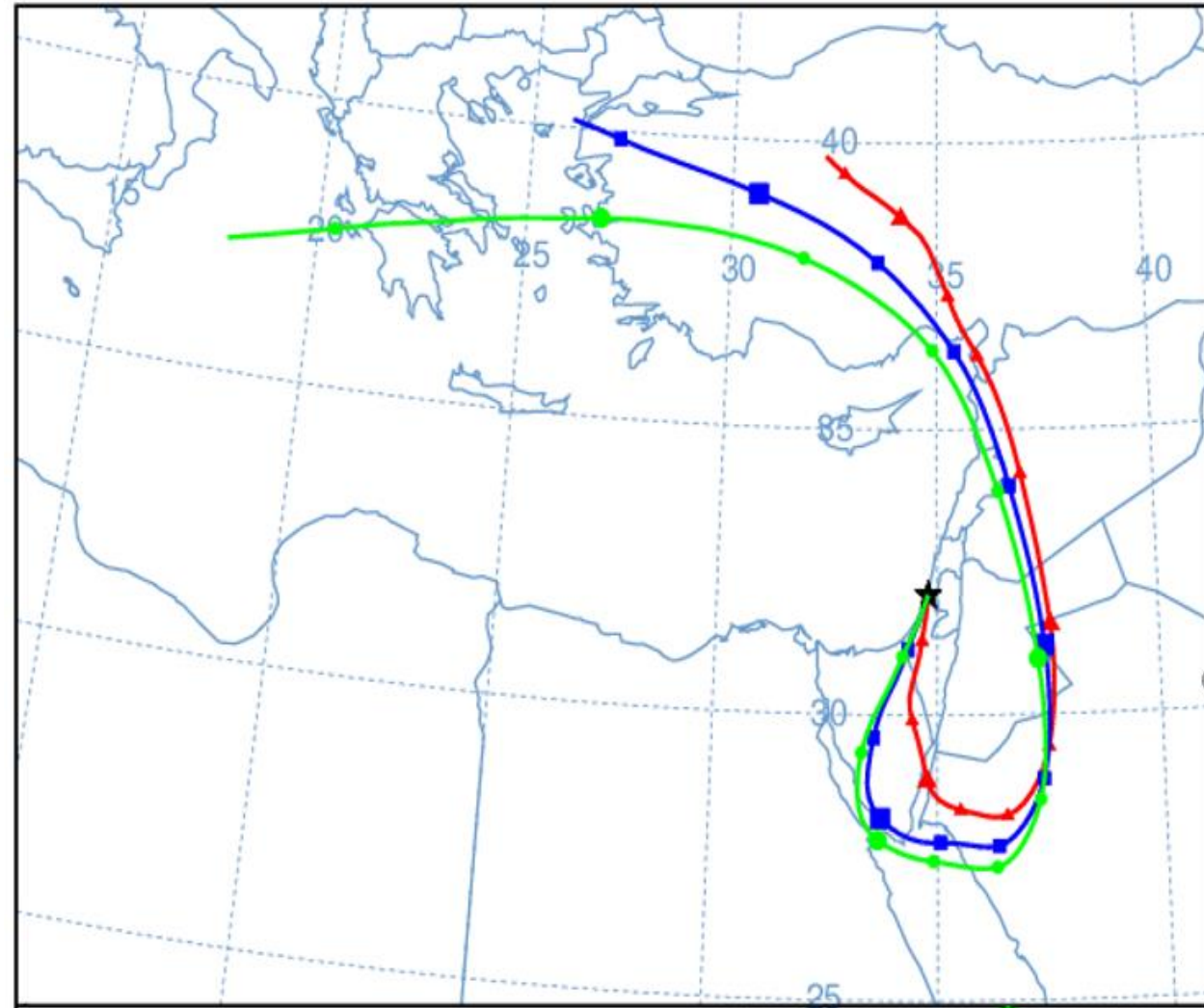
Air monitoring station



Marine:
High Na^+ , Cl^-



Desert:
High Ca^{2+} , Mg^{2+} , and SO_4^{2-}



Air monitoring stations

SO₂, NO_x, O₃, PM₁₀,
WS, WD, RH, T, rain

Lidar Polly^{XT}

Aerosol-types at
different heights

Air and Meteorological analysis

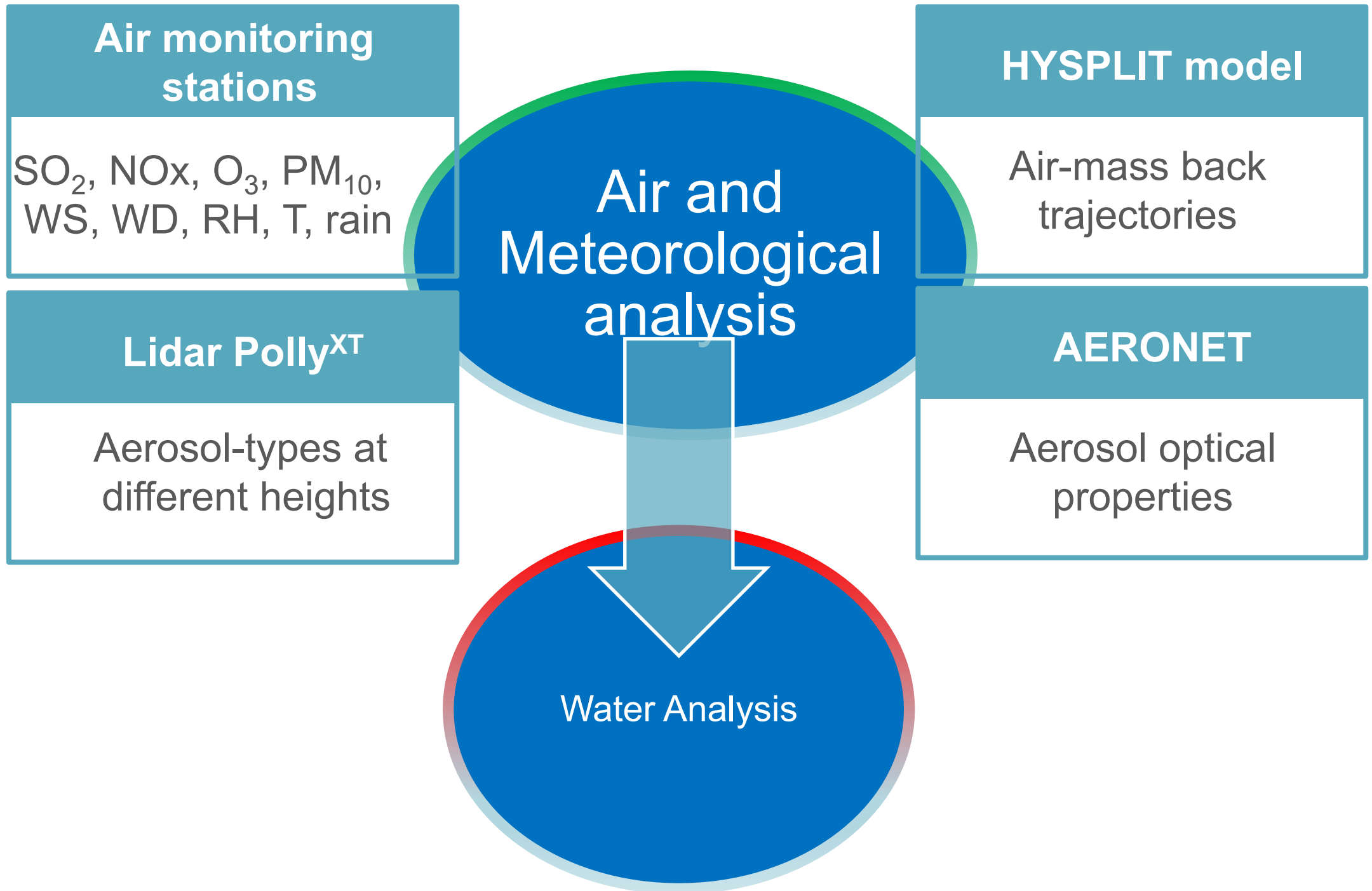
HYSPLIT model

Air-mass back
trajectories

AERONET

Aerosol optical
properties

Water Analysis



Main findings

- Using advanced methods, we found a direct quantitative link between the concentrations of ammonia, nitrogen oxides and sulfur dioxide in the air and the concentration of their decomposition products in water
- Regionally (and seasonally), the trajectory the air parcel went through the days before arrival to the sampling site affected the chemical profile of produced
- It possible to study the atmosphere using water extracted from it

Research Impact

1

Water filtration & treatment

2

Where can we produce water from the air ?!
(Haifa research)

3

Environmental monitoring

4

Regulation

Thank You !

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