
RCELONA DUST FORECAST CENTER
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6th Training Course on WMO SDS-WAS Products (Satellite and Ground Observation and Modelling (Atmospheric Dust)
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6th Training Course on WMO SDS-WAS Products (Satellite and Ground Observation and Modelling of Atmospheric Dust)
Turkish State meteorological Service (TSMS),
World Meteorological Organization (WMO),
European Organization fo the Exploitation of Meteorological Satellites (EUMETSAT),
State Meteorological Agency of Spain (AEMET) and
Barcelona Supercomputing Center (BSC)
When
Oct 25, 2017 to Oct 27, 2017
Where
Istanbul,Turkey
Add event to calendar
iCal
METEOROLOJİ
World Meteorological Organization
EUMETSAT
AEMet
Barcelona Supercomputing Center

GEOINFORMATICS
Research Institute (GRI)

Uni. Of Tehran

Indicators Development for Measuring Impacts of SDS

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&
Hosain Ali Bahrami, Saham Mirzaei, Kamil Mohamad Khani, Soghra Ranjbar, Bahareh Ramezani and Shahram Sedghi

Funded by:
Technology Development Council of Water, Drought, Erosion & Environment of the Vice Presidency for Science and Technology Affairs of IR-Iran.

Outline:

1. Health
   - ❖ Human
   - ❖ Animal
2. Agroforestry
   - ❖ Agriculture
   - ❖ Forest
   - ❖ Gardens
3. Transportation System
   - ❖ Air
   - ❖ Marine
   - ❖ Road
4. Industrial and Business Sectors
5. Environment
6. …

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Project Title:

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1. Simulation Design and Study Area Investigation
2. Human (Hospitalized people)
3. Animals
    1. House Mouse (Mus Musculus)
    2. Rat (Rattus Norvegicus)
4. Crops
    1. Wheat (Triticum Aestivum)
5. Trees
    1. Walnut (Real field)
    2. Oak (Quercus Persica)
6. Flowers
    1. Marigold (Calendola Persica)
    2. Violets (Viola Odorata)
    3. Rosemary Flower (Rosmariuns Officinalis)
7. Saifijat
    1. Tomato (Solanum Lycopersicum)
    2. Strawberry (Fragaria Ananassa)

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Iran SDS Situation

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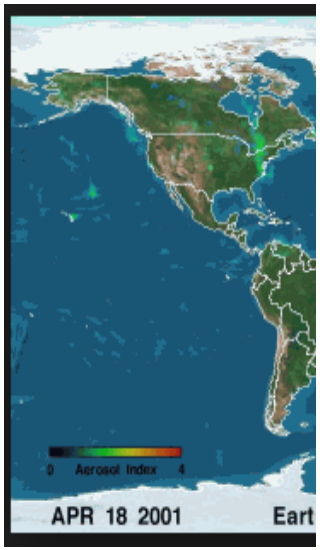
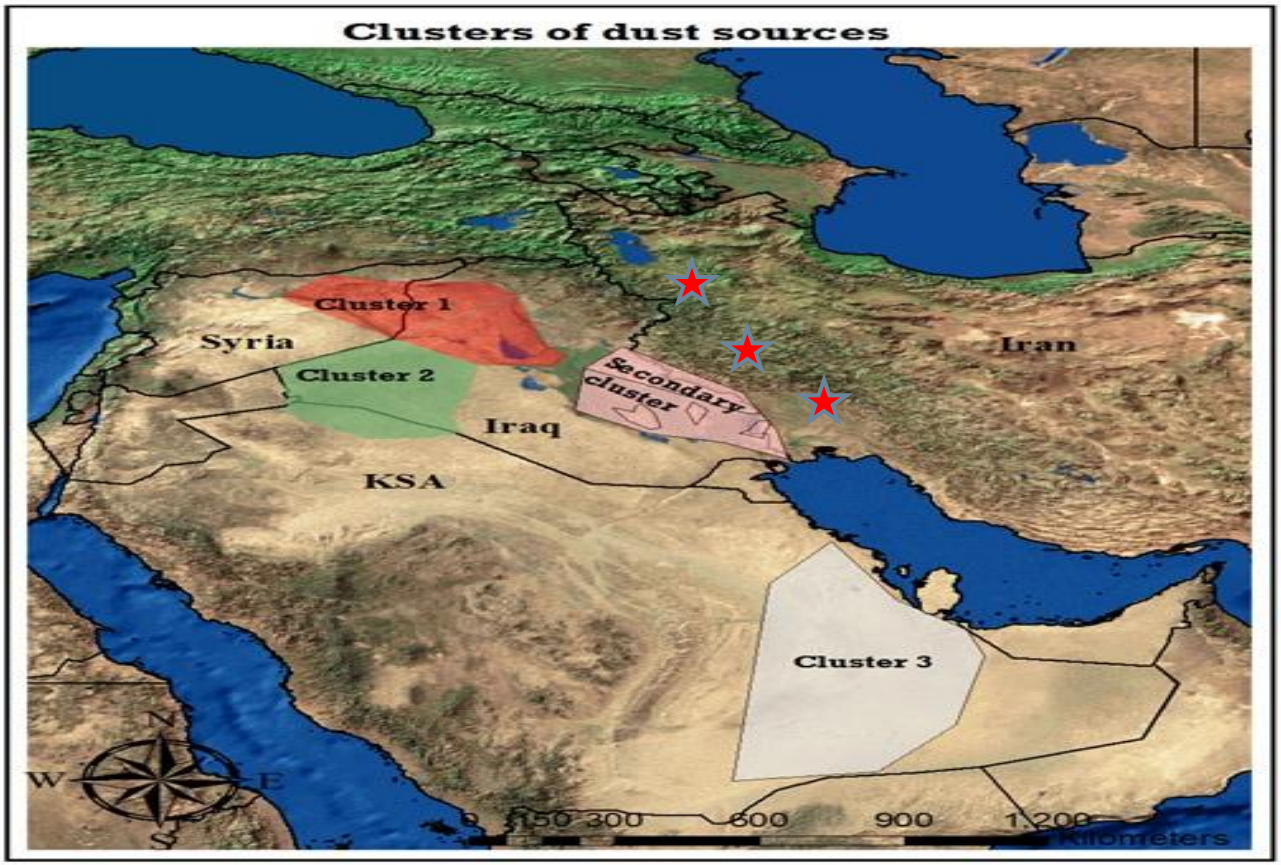
Cities with the worst outdoor air pollution

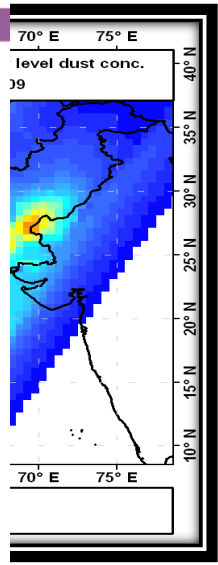
Pollution is defined as airborne particles less than 10 micrometers in diameter (PM10).
Values shown are annual averages in micrograms per cubic meter of air.

Overall





372



Urumqi	140
Jinan	123

Types of SDS

1. Mineral (Desert, Sahara)
2. Agricultural & Rangelands
3. Industrial (Cement industry)
4. Urban and Road
5. Dried river, dam and wetlands

SDS IS A GLOBAL ISSUE

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Dust Storm Simulation Design (2015)

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SDS Simulation: Portable Wind Erosion Tunnel

Lab: Greenhouse, Medical Lab, Soil Lab, etc

SDS Tension Simulation: Similar to Ahvaz

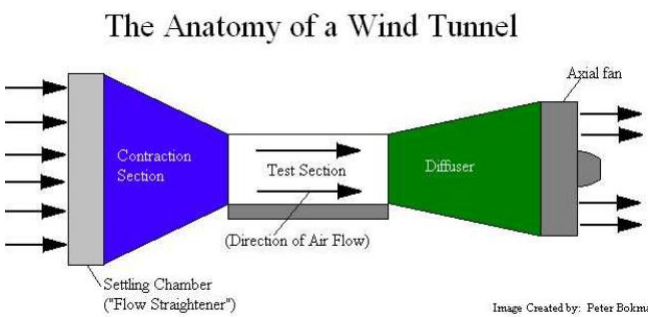
Time Periods: From 1 to 6 Days

Concentration:

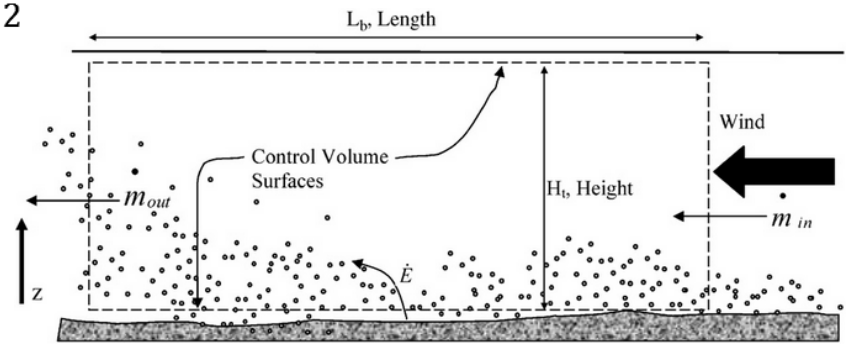
- Low (350 mg/m^3)
- Medium (750 mg/m^3)
- High (1500 mg/m^3)

Dust samples: Ahvaz

By: UT, TMU, MUI, 2015



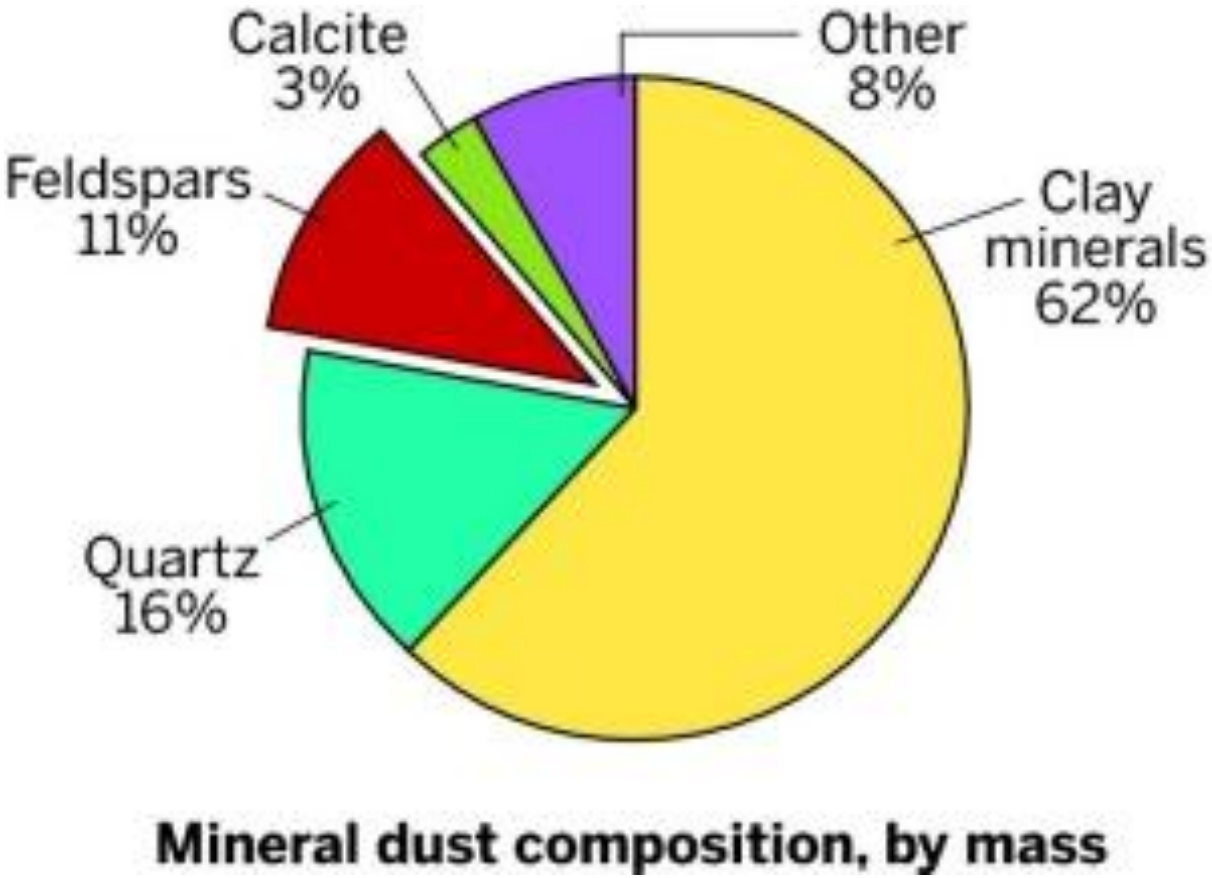
$$A = \pi r^2$$



Microdust pro detector and how to measure airborne dust

Dust Composition

Mineral SDS Compositions



Puneet Kollipara 2013

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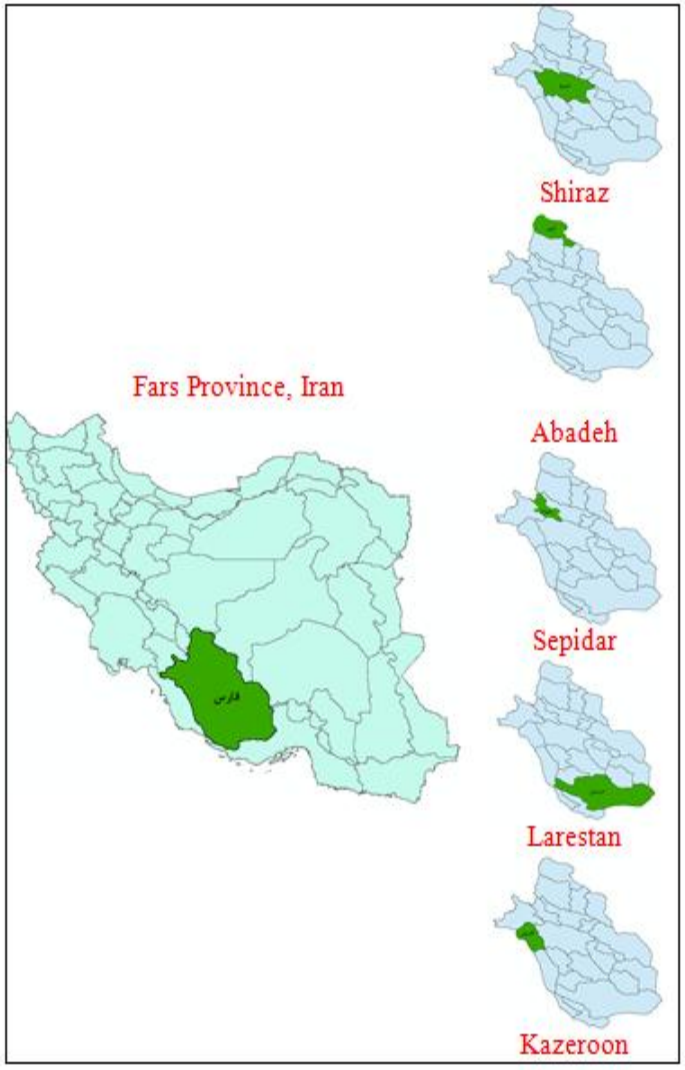
Phase 1
Analysis of Human Cardiovascular Diseases caused by dust storms (2015-16)

Uni. Of Tehran



Location: Fars Province, South West of Iran

Time Period: 8 years (21 March 2006 – 22 March 2014)

Cities: Shiraz, Abadeh, Sepidar, Larestan & Kazeroon

Hospitalized People: **13661**

Respiratory Diseases: Asthma, COPD, Pneumonia, and ARD

Heart Diseases:
Heart Failure, Ischemic, Cerebrovas Cular, Mitral Regurgitatia, Cardiomypathy, and Angina.

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Analysis of Human Cardiovascular: Heart and Respiratory Diseases as Indicators

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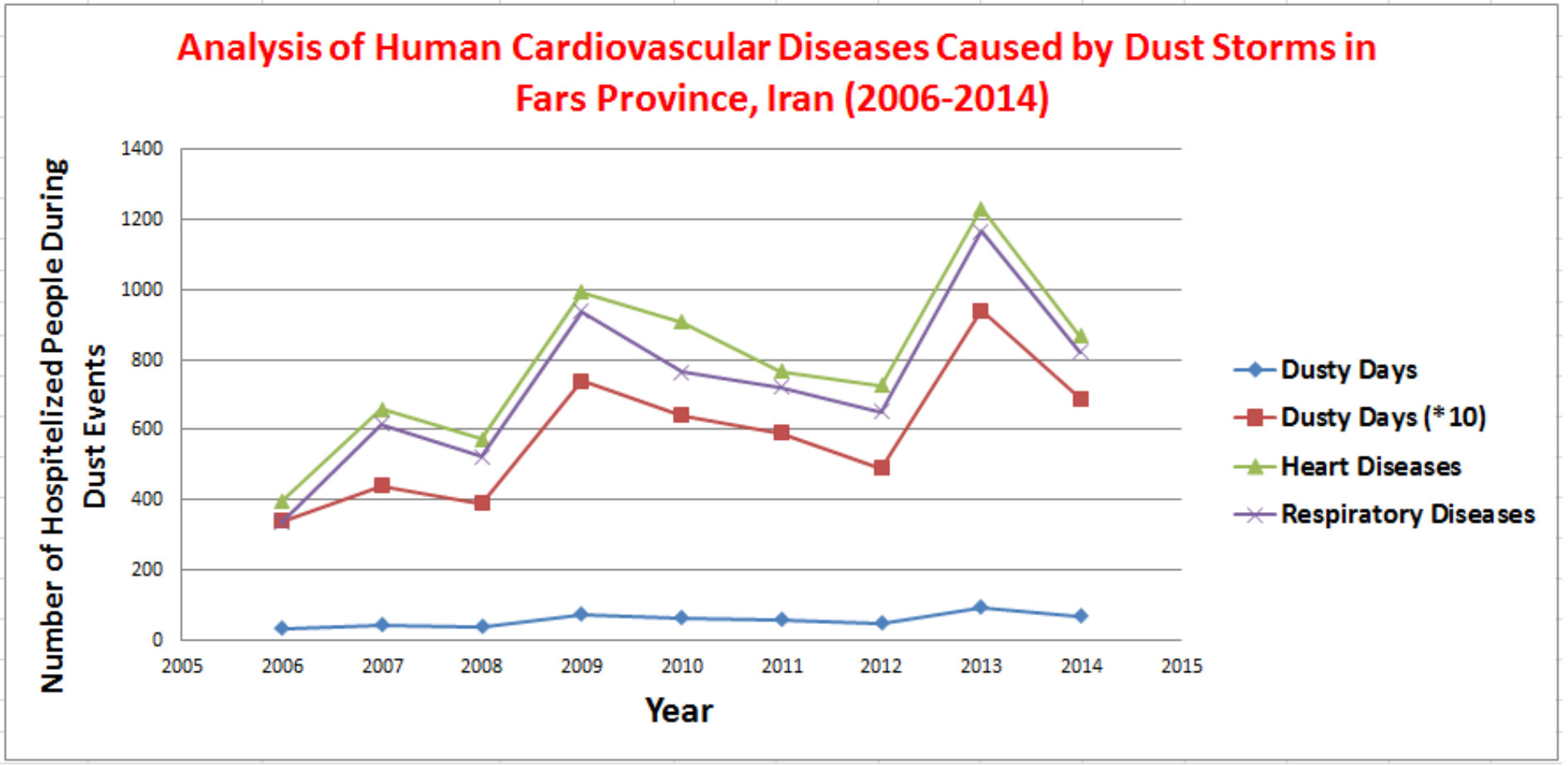

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Dust Particle Effects on Animals

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Species:

- House mouse (Mus musculus) and
- rat (Rattus norvegicus)

Diseases:

- Blood test,
- lung disease and
- eyes diseases

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Dust Particle Effects on Animals

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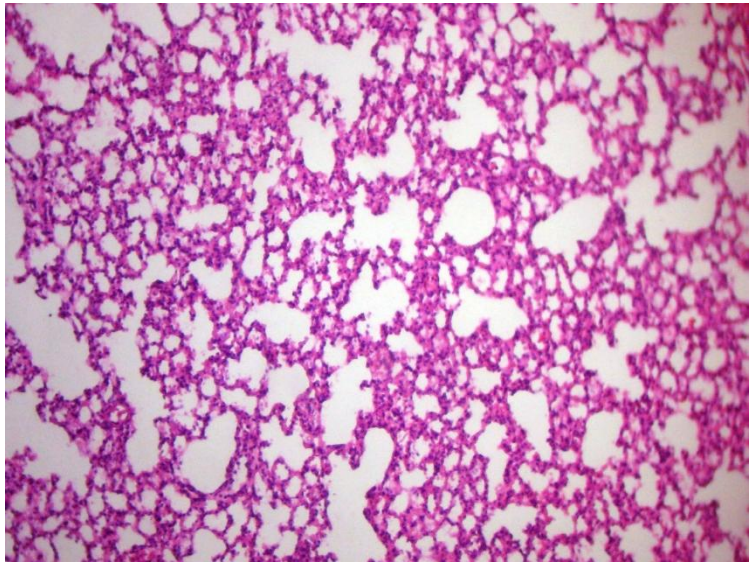
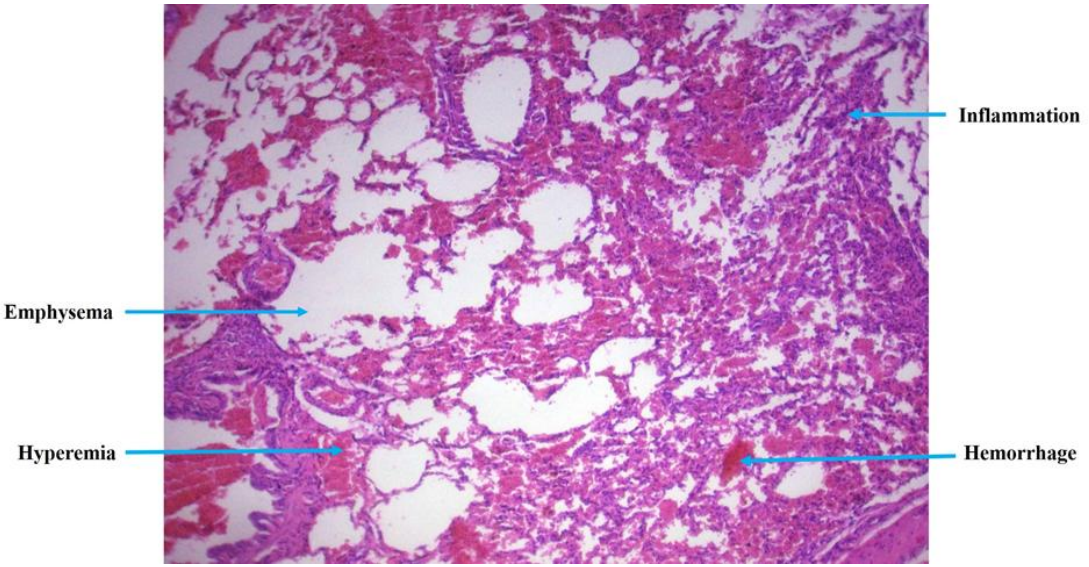
Control Rat (Normal lung)

Rat lung (6-Day/1500 µg/m^3 treatment)





Lung emphysema, hyperemia, hemorrhage and inflammation of Rat lung (*Rattus norvegicus*)

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Animal Health Indicators

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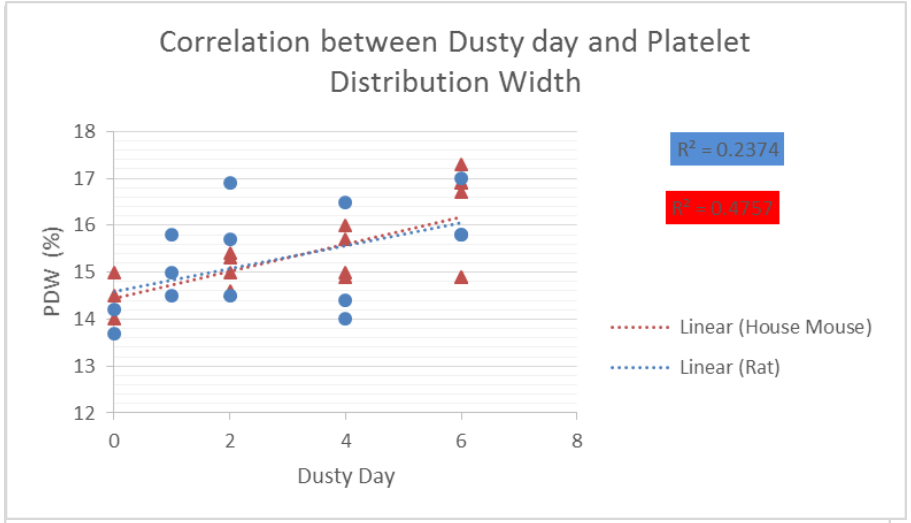
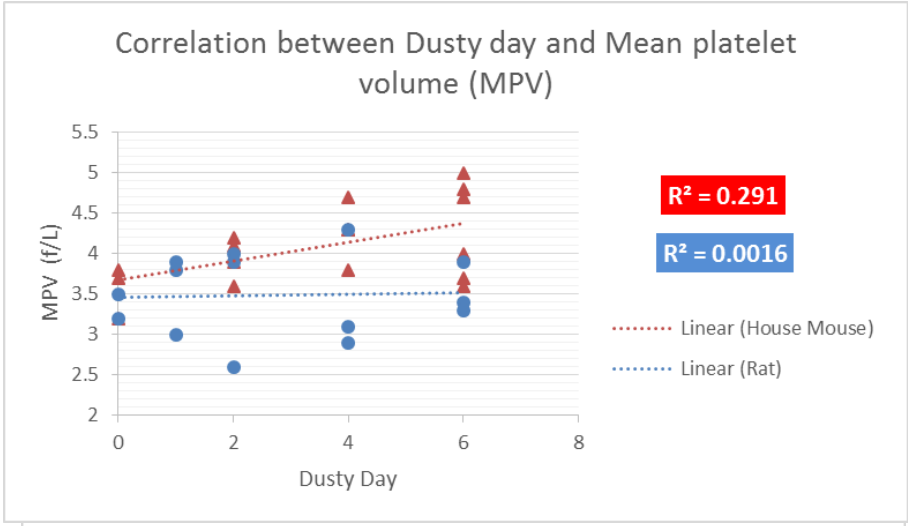
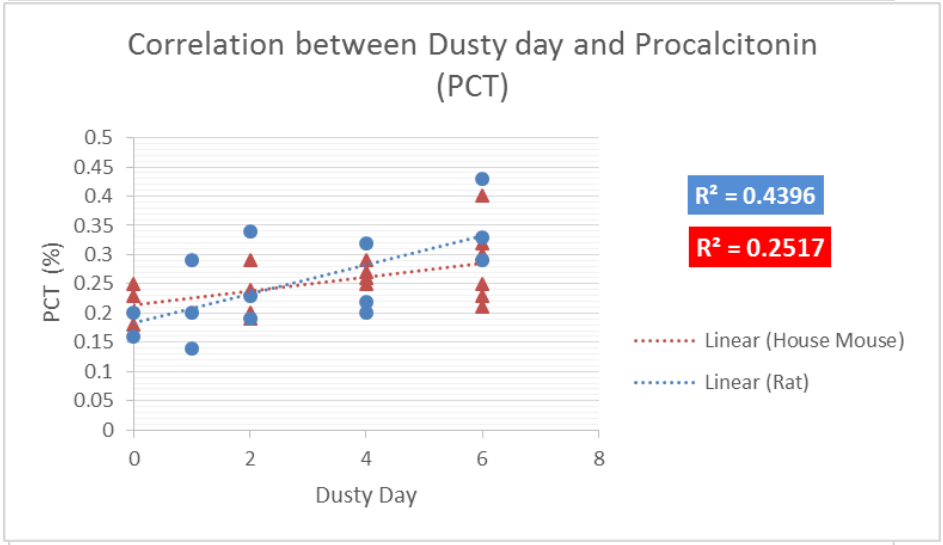
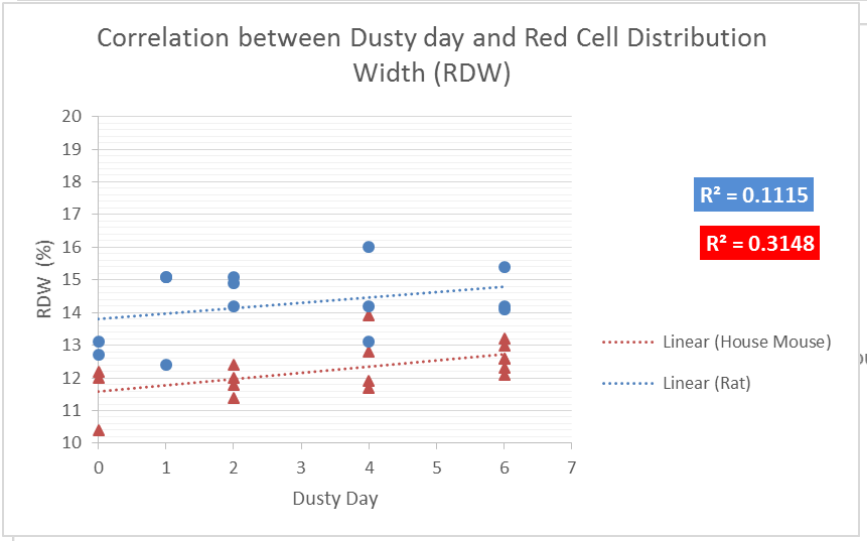


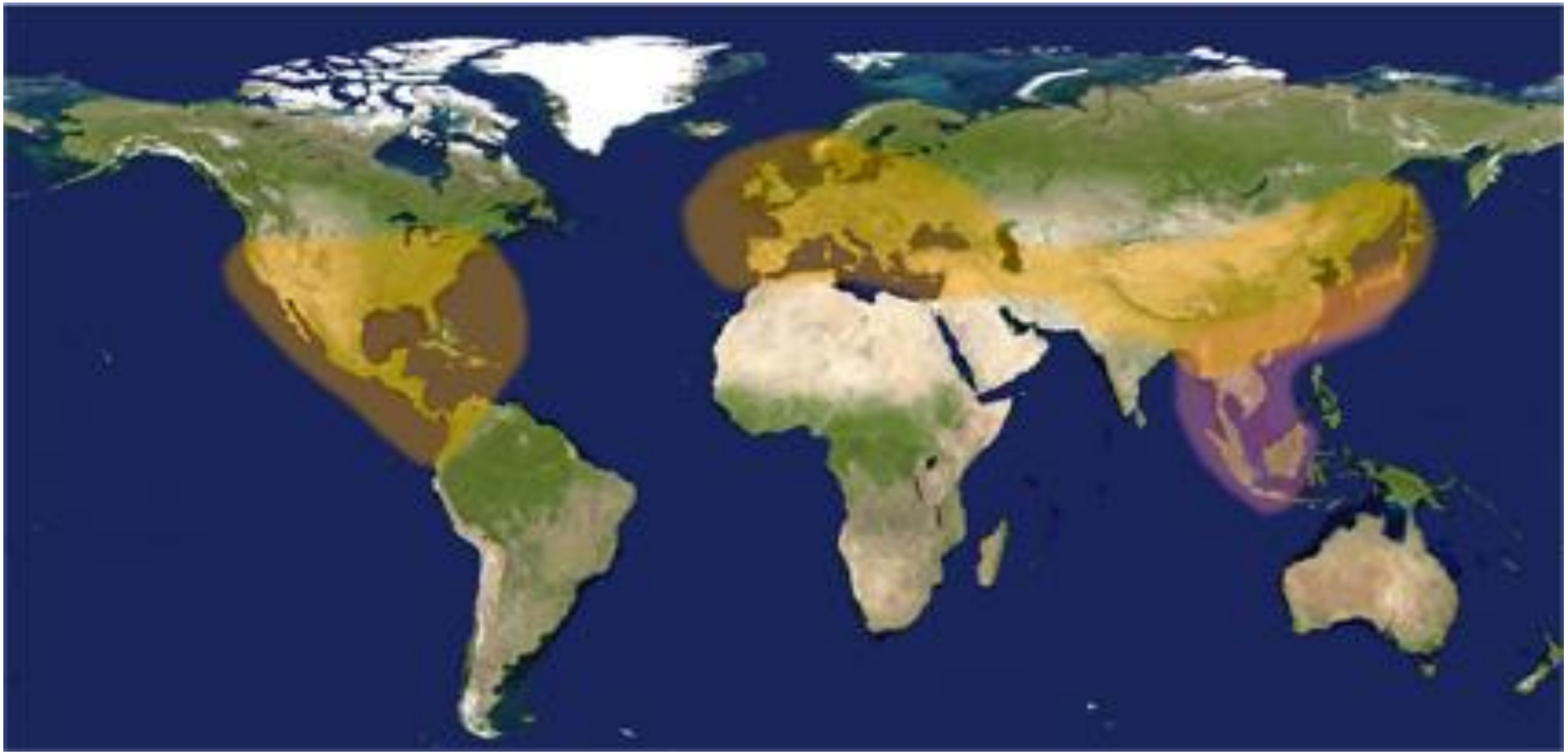






Oak investigation?

Distribution of oak forests in the world



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Oak investigation?

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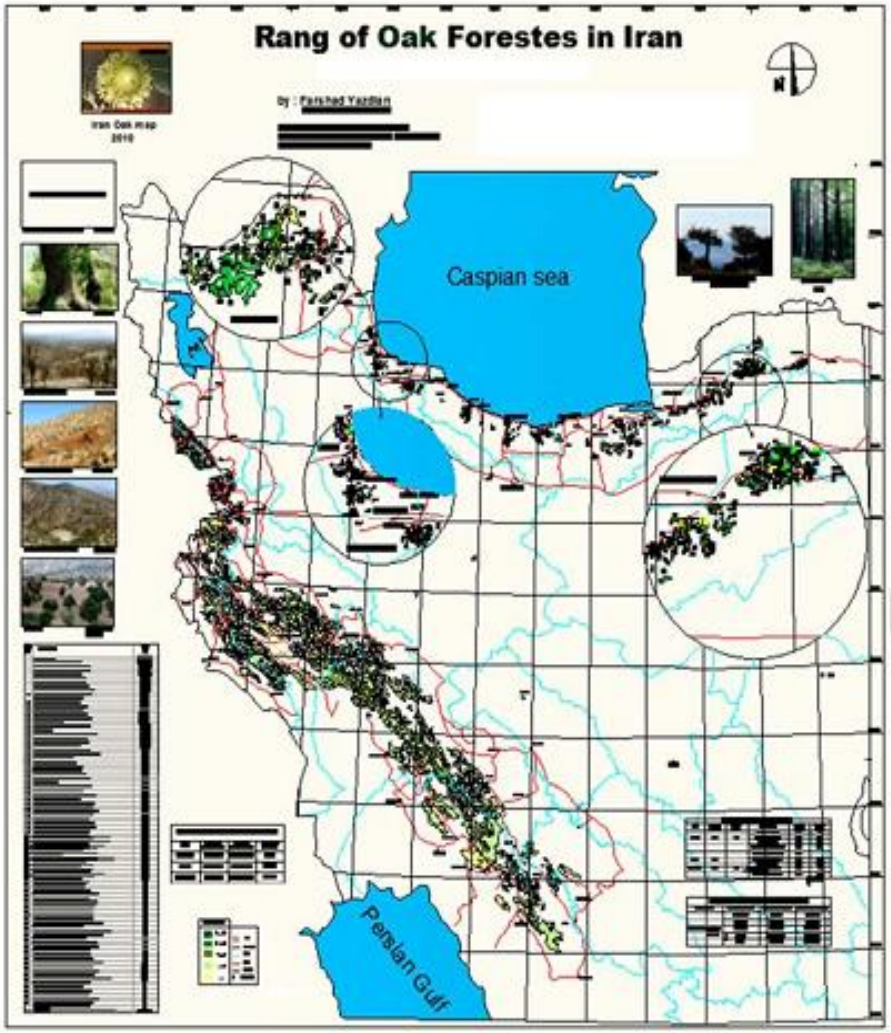

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Oak investigation?

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Control

Greenhouse and create stress on samples

- **Low (350 mg/m^3)**
- **Medium (750 mg/m^3)**
- **High (1500 mg/m^3)**

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Oak investigation?

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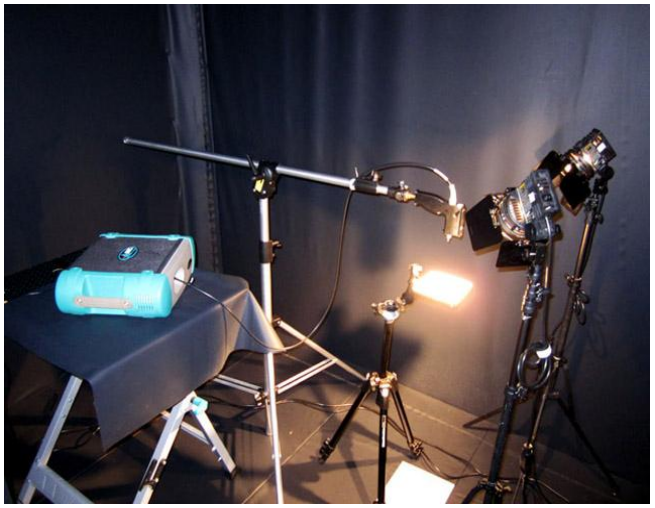
Quercus persica 2 year seedling exposed to simulated dust in low (350), medium (750) and high (1500) level concentration during one growing season.



Laboratory spectroscopic measurements with fieldspec3

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Oak investigation: Leaf Biomass, NDVI and Spad as Indicators

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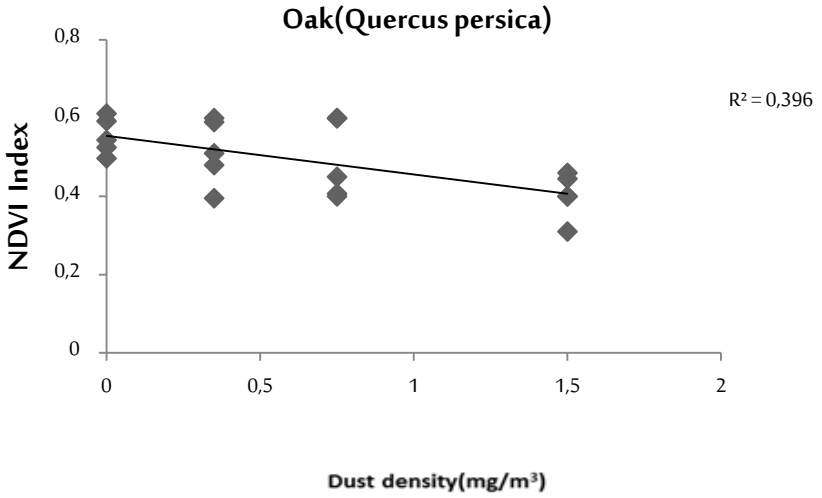

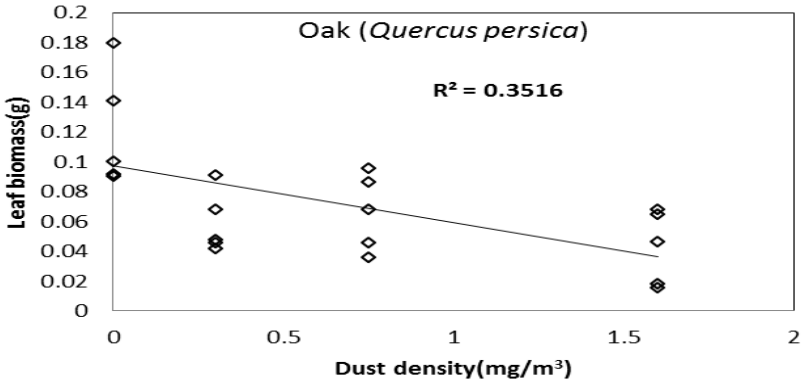

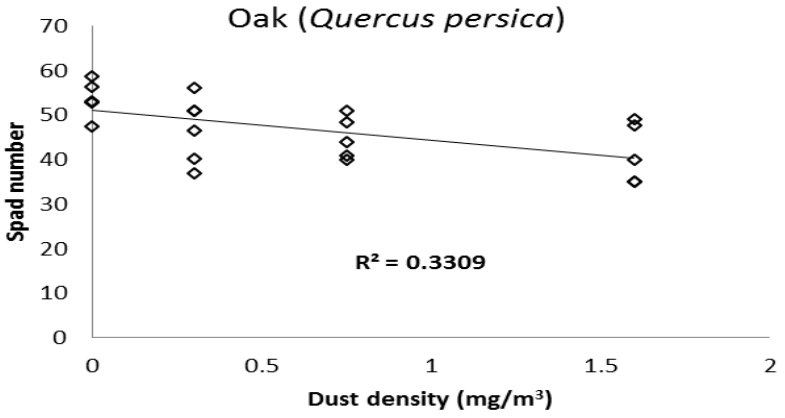

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Plant Phenology by Remote Sensing Images as an Indicator

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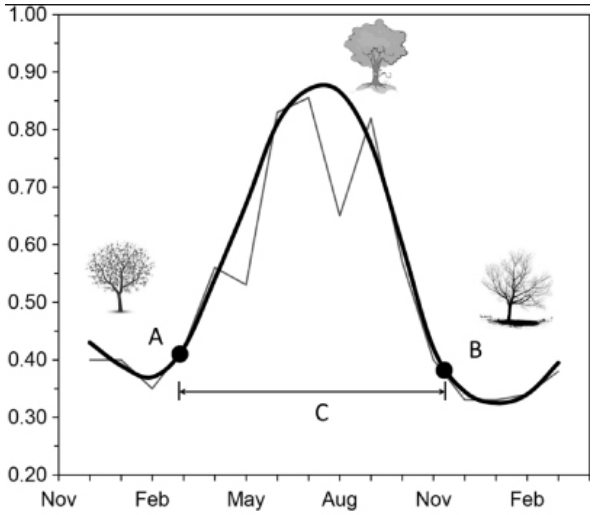
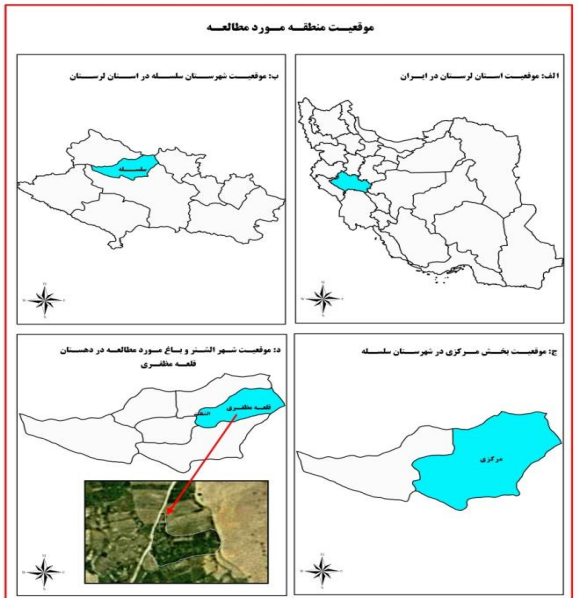
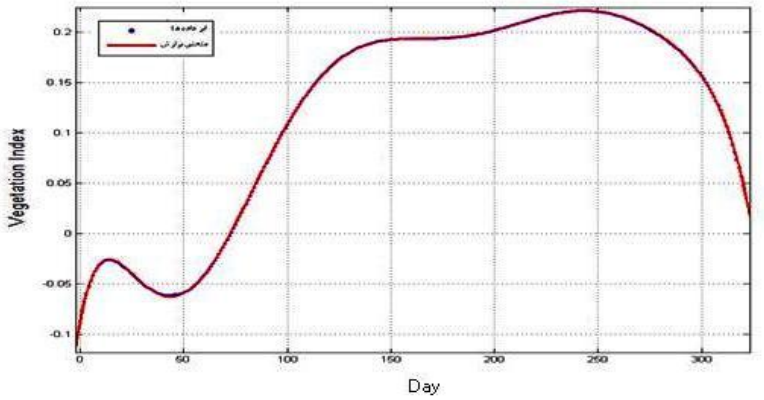


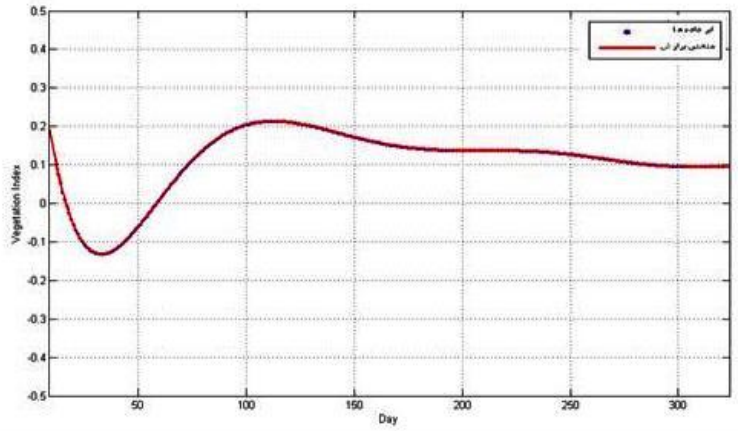


Walnut Tree Phenology in Alashatr, Iran

2004

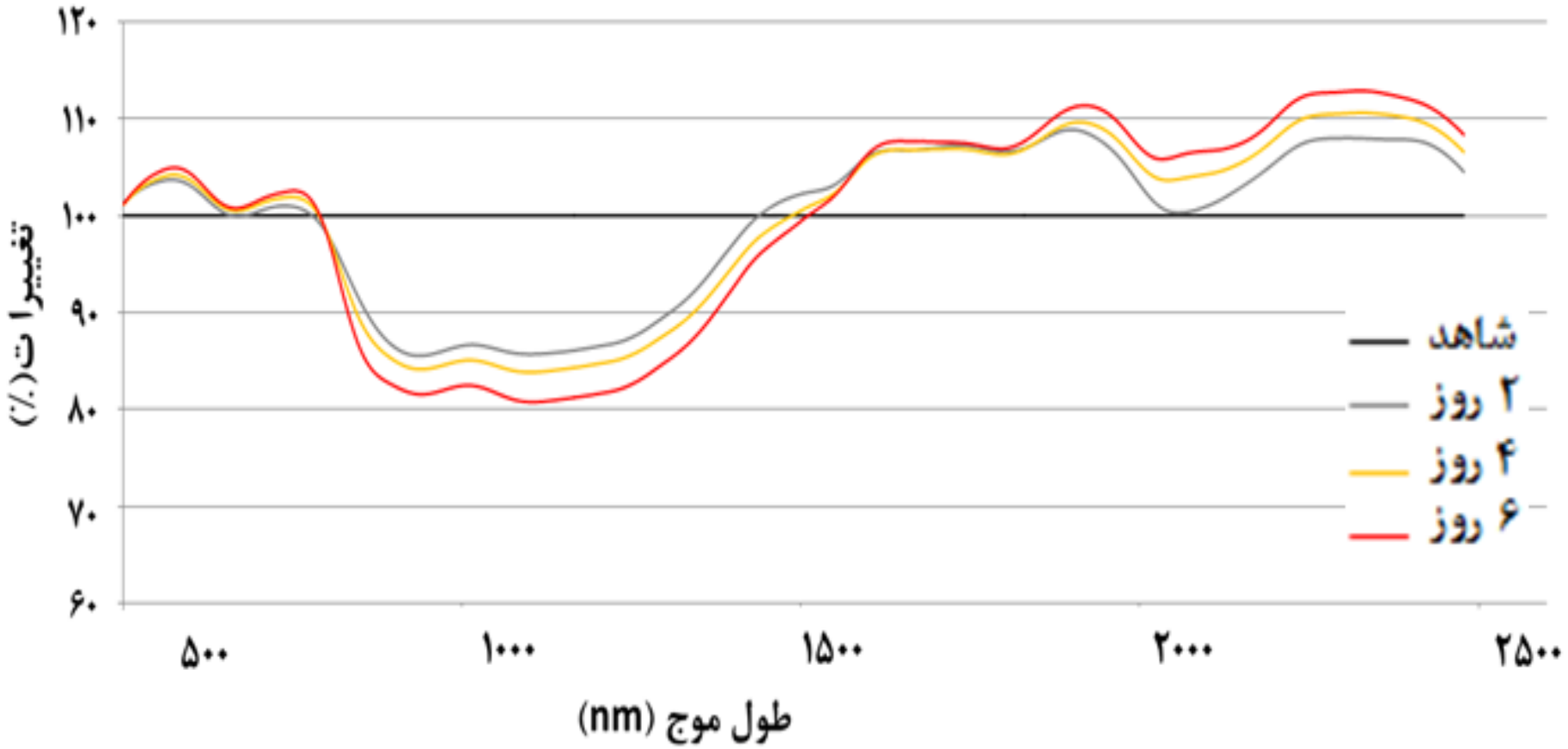


2008



Strategic Crops: Wheat: Spectral Curve as Indicator

Cultivation Area: 6 Million Hectares in Iran



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Some Other Species

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Strawberry

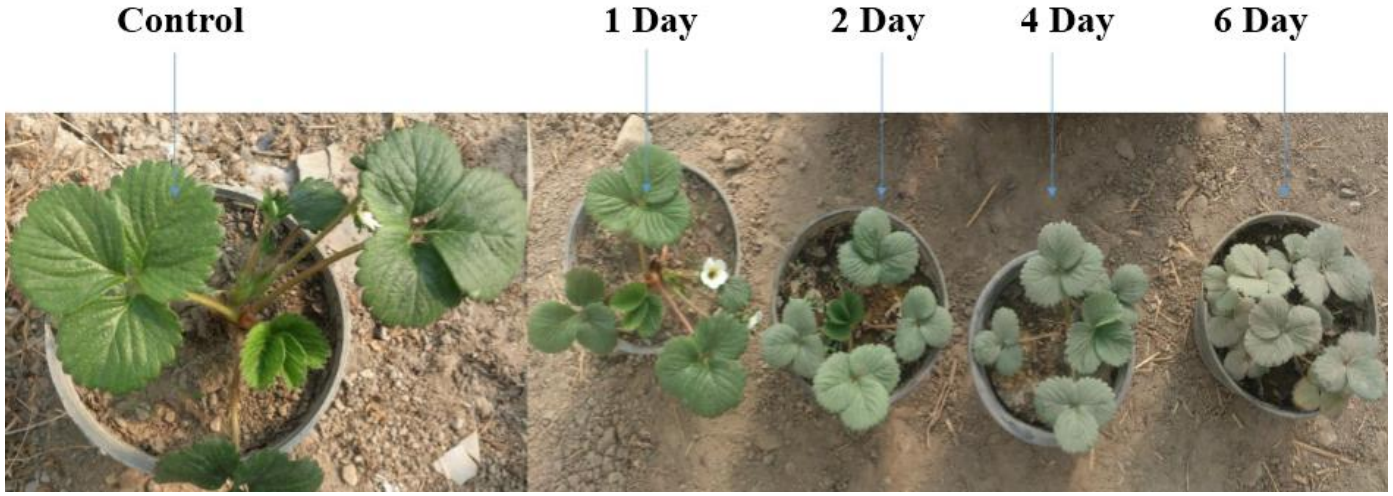
Tomato

Vvioletas

calendula

Dust periodic tension

Dust Particle Effects on Plants



Ragaria ananassa **plants exposed to simulating dust in different periods (1, 2, 4 and 6 days).**

Quercus persica **2 year seedling exposed to simulated dust in low (350** ***μg/m3*****), medium (750** ***μg/m3*****) and high (1500** ***μg/m3*****) level concentration during one growing season.**

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Multi Level Industrial SDS Impact Assessment on Forest Cover: Mazandaran Cement Factory

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Multi Level Industrial SDS Impact Assessment on Forest Cover: Study Area

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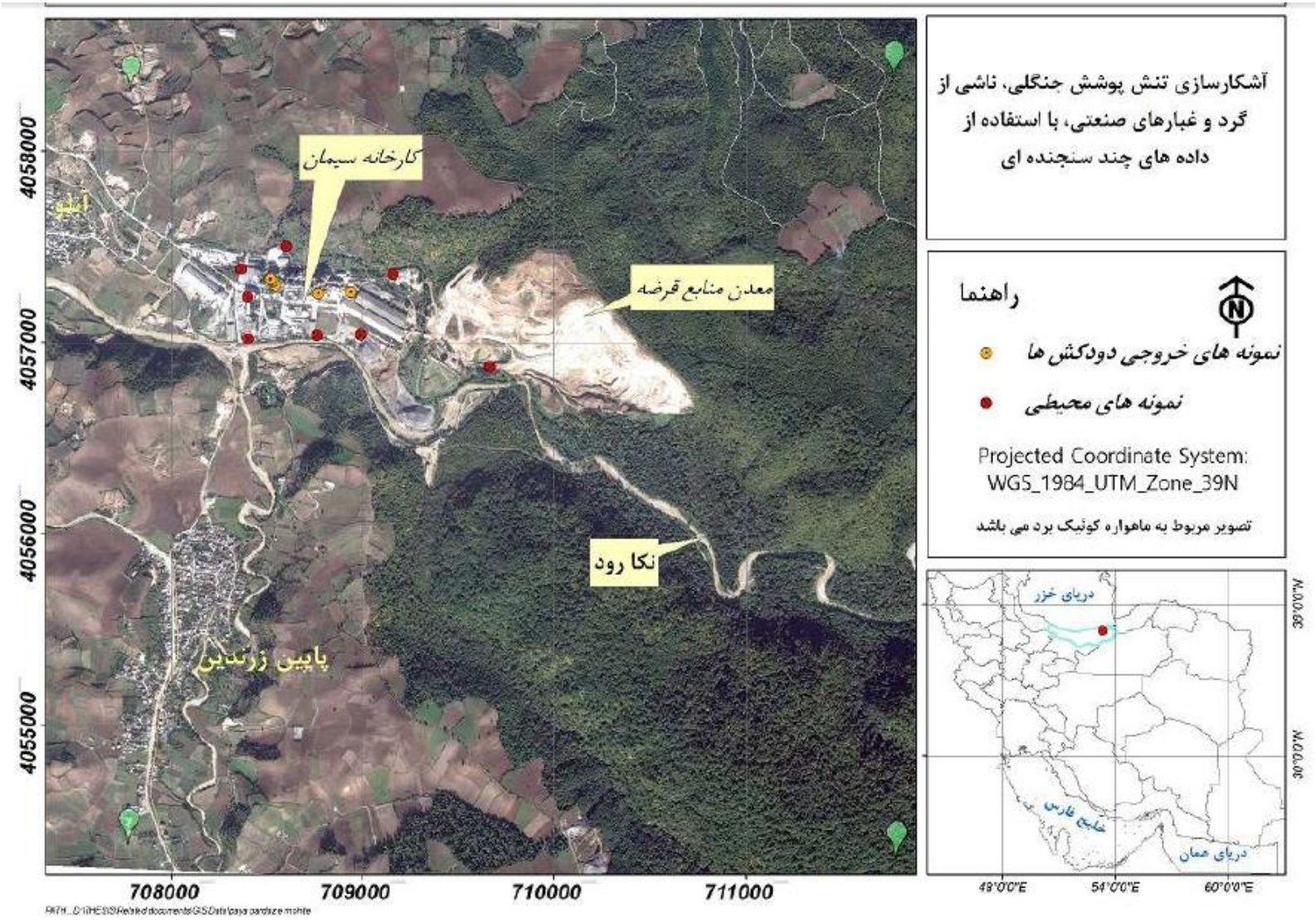

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Multi Level Industrial SDS Impact Assessment on Forest Cover: Multi-Scale Investigation

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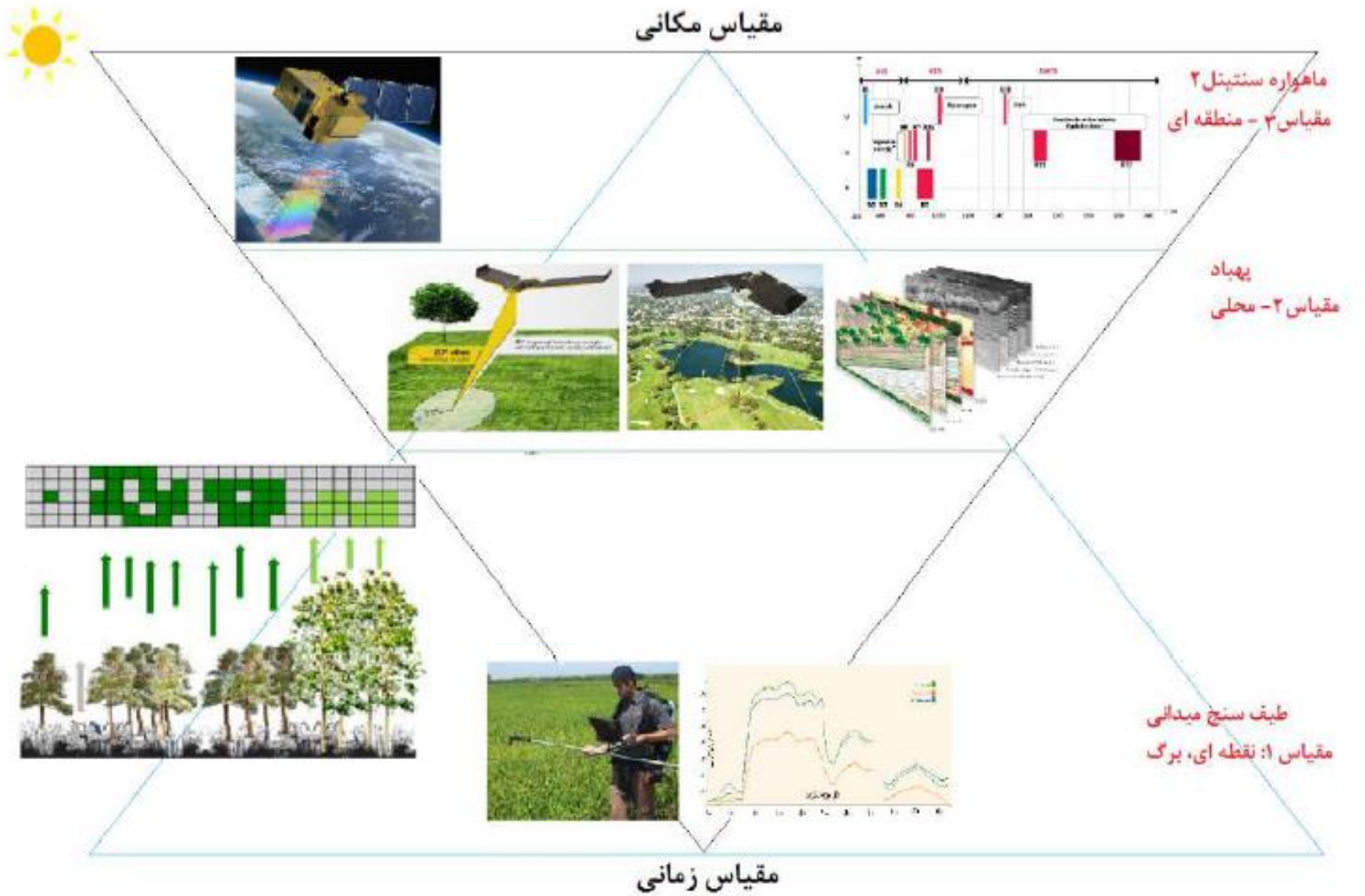

Methdology Framwork for SDS Vulnerability Mapping

What is Next?

(i) How to scale up the developed indicators to remote sensing scale?

(ii) How can use the indicators to SDS Economical Impact Assessment, SDS Vulnerability Mapping and SDS planning for competing, etc?


Thank You!
Questions?
Comments?
Suggestions?