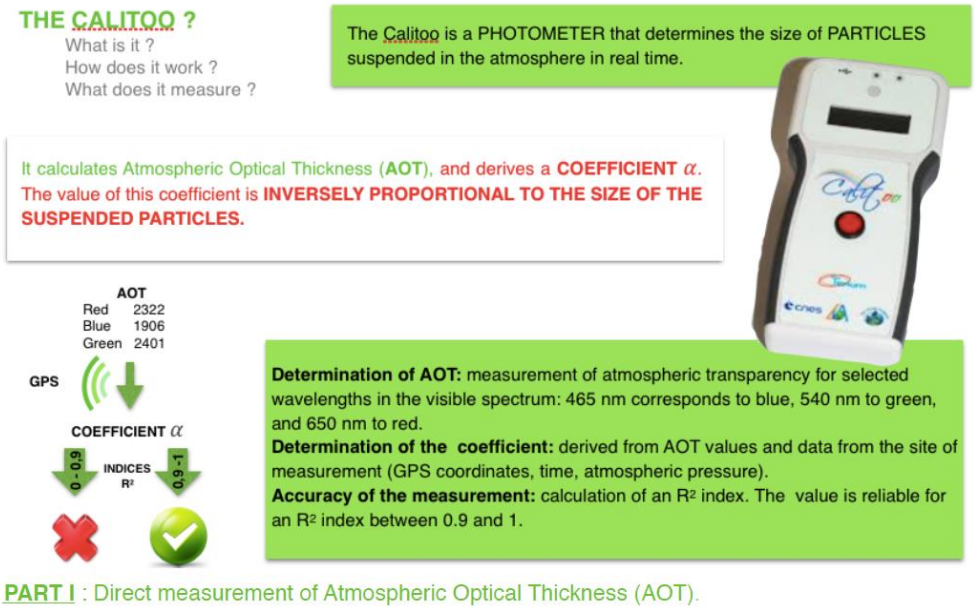
TP3 – NORSK OVERSETTELSE

Som for de skriftlige prøvene har vi oversatt enkelte ord og begreper til norsk. Disse står i parantes og er uthevet i kursiv (det er og det engelske ordet) og motsatt står det norske ordet i ”italic” om det opprinnelige står i kursiv. Ikke alle tabeller og bilder kopieres over i denne norske versjonen. Så bruk både engelsk og norsk versjon i arbeidet ditt.

PRACTICAL TEST: A PERIOD OF POLLUTION IN WESTERN EUROPE
In the past decade, public health problems (chronic illnesses, allergies) linked to air quality have multiplied. Fine particulates (≤ 2.5 μm, $PM_{2.5}$) are clearly a prominent factor specified by the World Health Organization. **We are interested in monitoring particles that results from human activities (transport, burning of fossil fuels, etc…).**



Tekst i figuren over som er oversatt:
Photometer (lysmålingsinstrument), particle suspended (partikler som holder seg svevende), transparancy (gjennomlysbar), derived (utledet), reliable (til å stole på)

Instructions:
If sunny
- Familiarize yourself with the equipment and its operation (Quick start guide).
- Take three measurements *validated (bekreftet)* by an R_2 above 0.9.
- Record the results on the answer form, then calculate the average of the measurements.

If cloudy
you will not make any measurements. α-values will be provided.

Here are two values recorded with a photometer :
- The eruption of the Eyjafjallajökull volcano in 2010: value close to 0.4 over France.
- Near the Antibes highway during this winter: value close to 1.6.

Question 1: The average of your photometer measurements indicates that today the fine particles above Sophia Antipolis… (only one answer possible)

1- are larger than those produced by automobile *exhaust (eksos).*
2- are smaller than those due to automobile exhaust.
3- are larger than those of volcanic ash.
4- *results obtained (måleresultatene)* do not permit any evaluation of atmospheric particle size at the time of
measurement.

"**PART II** : Comparison of the values obtained with particulates of known size.

Instructions :

- Familiarize yourself with the principle of measurement of the coefficient for a mixture in a test tube (See tutorial « Measuring global AOT of the atmosphere »).
- Make three measurements of the coefficient for each sample: milk with water (test tube 1), and clay with water (test tube 2).
- Record the results on the answer form and calculate the average for each sample.

Question 2: Based on the data you obtained, *fine particulates (finkorna partikler)* above Sophia Antipolis are … (only one answer)

1- smaller than those of milk.
2- larger than those of clay.
3- of a size between those of clay and milk.
4- The size cannot be determined from the results obtained today.

PART III : A particular situation in the spring of 2016.

One morning in April, the air was laden with fine particles visible to the naked eye. Car windscreens were covered with a deposit of fine yellow particles. **Your task is to determine the nature of these particles.**

FIGURE 1 : (A) Light photomicrograph of a particle collected from a car windscreen. (B) Size range of different categories of fine particles. ***On this day in April, the value of α-value was smaller than that obtained from the suspension of wood ash (rich in calcium salts).***

Particle tested	Reagents, their quantities and the ensuing reaction			
	HCl (1 drop)	H_2O_2 (1 drop)	$AgNO_3$ (1 drop)	Ammonium oxalate (1 drop)
Limestone	Fizzing	No reaction	No reaction	White precipitate
Biological molecule	No reaction	Fizzing	No reaction	No reaction
Clay	No reaction	No reaction	No reaction	No reaction
Sodium chloride	No reaction	No reaction	White precipitate	No reaction
Calcium salts other than carbonate	No reaction	No reaction	No reaction	White precipitate

TABLE 1 : Chemical reagents used to determine the nature of particles.

Tekst i tabellen over som er oversatt:
Ensuing (påfølgende), fizzing (brusing), precepitate (bunnfall)

Instructions :
- Familiarize yourself with the equipment available at your work station.
- Before you start working, **put on the safety glasses**.
- Only perform two tests to determine the nature of the unidentified particles.

Question 3 : Using Figure 1 and Table 1, indicate the two reagents necessary to identify the chemical nature of the yellow dust. (Two answers expected)

1- HCl
2- H_2O_2
3- $AgNO_3$
4- Ammonium oxalate

Question 4: From the results obtained, indicate the nature of these fine particulates. (only one answer)

1- Industrial smog
2- Tobacco smoke or incense
3- Particles of clay
4- Salt crystals
5- Virus
6- Ash originating from fire
7- Pollen
8- Limestone dust originating from a nearby *quarry (dagbrudd/åpen gruve)*

PART IV : A period of pollution in Western Europe during the winter of 2017.

FIGURE 2 : (A) Concentration of atmospheric fine particles (<2.5 µm in diameter) on 25 January 2017. The map was prepared by measurement and application of a model (PREV'AIR network). (B) Map with isobars for Western Europe on 25 January 2017. The black line represents the path of the satellite in figure 3.

FIGURE 3 : (A) Explanatory thumbnail image (det lille innsatte bildet) *of the method adopted for the imaging LIDAR (Light Detection and Ranging). During its passage above the region of interest, the CALIPSO satellite* emitted (utstrålte) *a laser beam whose profile of* dispersion (spredning) *was collected and analyzed to* deduce (utlede) *the composition of atmospheric particles. The image is therefore a cross-section of the atmosphere. (B) Image obtained by the passage of the satellite over Western Europe on 25 January 2017. The yellow and red colors indicates the presence of* $PM_{2.5}$ *particulates. The grey trace close to the surface corresponds to clouds.*

TABLE 2 : Results of temperature measurements for an atmospheric column. The weather balloon was released from a German weather station shown in Figure 3B (white dot).

Question 5 : On the answer form, plot the curve of the air temperature as a function of *altitude (høyde over havet).*

Question 6 : Name the Limit A marked in Figure 3B: (only one answer possible)

1- Stratopause
2- Tropopause
3- Mesopause
4- The lower limit of the exosphere

Question 7: Refer to question 5. At what altitude do you find the layer of fine particulates above the German weather station? (only one answer possible)

1- about 500 m
2- about 1,000 m
3- about 2,000 m
4- about 12,000 m

Question 8: What conditions are necessary to obtain a cloud of fine particulates at low altitude? (several answers possible) :

1- A zone of low pressure.
2- A zone of high pressure.
3- Emission of fine particulates by natural or anthropogenic activities.
4- A layer of cold air on the ground blocked by a temperature inversion.
5- A layer of warm air on the ground blocked by a temperature inversion.