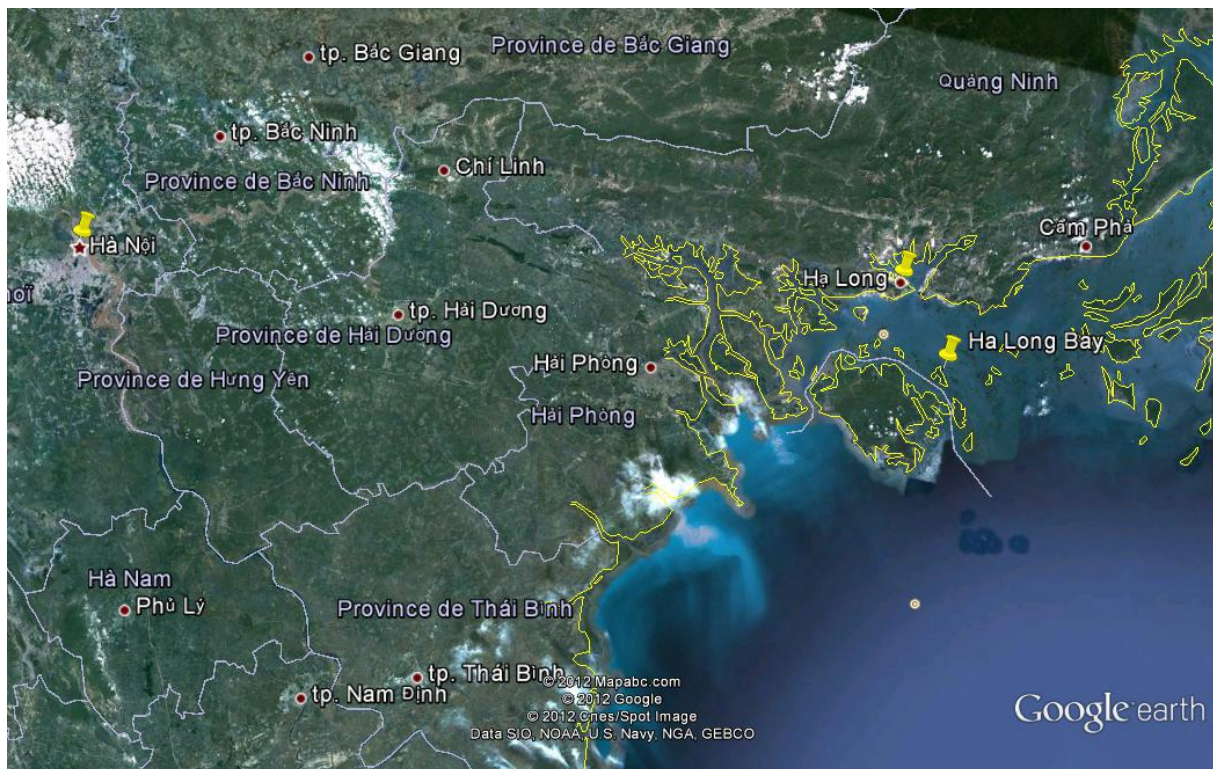


Early report of the aerosol sampling campaign



The main objectives of this mission were the installation of the fixed station on a roof in Ha Long city, the formation of the persons in charge for the long-term (one-year) experiment in Ha Long city, the sampling of the aerosols in a mine and in the bay. These three different spots were identified to give a first view of the transport from a source (the mine) into the bay through the town. These three spots were: roof of the Monitoring and Analysing Division No1 of the Department of Natural Resources and environment of the Quang Ninh province, the Nui Beo open mine and the Ha Long bay. The definition of the three spots was performed by the French partners, after exchanges between all the partner in July during a mission of Mme Lan in France, and the finding and access were performed by the Vietnamese partners.



The necessity of sampling aerosols has been identified after the first visit last year. Analysing the Lidar measurements requires the knowledge of the optical properties of the aerosols. This

can be done only through collection and further laboratory analysis. Thus contacts were taken with scientists in France, specialist of the physico-chemical analysis of aerosols and their impact on environmental and climate issues. The identification of the equipments, the determination of the experimental protocol and the preparation of the campaign (including training of Thomas Pino and Christophe Lefumeux) were done with these scientists. Their institute is the Laboratoire des Sciences du Climat et de l'Environnement (LSCE, CEA/CNRS). The equipment which was brought to Vietnam (including that installed on the roof) has been rent by the ISMO partner, and paid to the LSCE. Preliminary analyses are also included in the price. In total, part of the full price is also covered by the LSCE because of their interest in the complementarity with the Lidar. It is important to remark that installation of the instrument on the roof in Ha Long city was the first goal, but in case of unsuccessful experiment and installation, all would have been moved to the roof of the IOP-VAST in Hanoi. Thanks to the success of the mission, it is now installed in Ha Long city.

The equipments are: 1 collector URG 2000-30-EN cyclone PM 2.5 (10L/min), 1 collector-type impactor PM2.5 (4L/min) and 1 portable impactor. The manual and protocol for use of these instruments were prepared by C. Lefumeux. All the small equipments necessary (pumps...) were also taken while few things were bought in Vietnam to avoid too much weight in the plane.

The campaign was a clear success. Mainly all experiments programmed were performed, according to the detailed programmed listed below. The main problem was that a shower rain on Friday evening the 16th followed by a strong wind (North) in the night cleaned up the atmosphere for few days. Thus the amount of aerosols that could be sampled was not as high as hoped initially for chemical analysis. Sampling time had to be increased in some cases (in particular in the bay) to get enough aerosols. The filters will be brought back to France for analysis in the LSCE. In addition, mine collections were not as fast as expected and one instrument could not work on Tuesday morning for the second collection. Overall, the first (and the only one without analysis) scientific outcome is that all aerosols below 2.5 micron diameter are containing a large amount of carbon. The source of it has to be determined (coal, soot...).

The team during the mission in Quang Ninh:

France: Philippe Bréchnac, Christophe Lefumeux and Thomas Pino are part of the lotus project. Stéphane Douin is a scientist at ISMO and is involved in the development of a new Raman teledetection system for differentiation of carbon particles in the atmosphere. He is a specialist on the development of sensitive technics for gas phase detection. Jean-Noël Rouzaud is a world specialist on the microscopy at all scale on carbon structure in general and coal in particular. He is a collaborator on the project of differentiation of carbon particles nature (coal, soot ...).

Vietnam: Mme Lan is co-leading the Lotus project with Philippe Bréchnac. Her assistant and two colleagues of her were also present part of the time during the campaign. I am very sorry to not being able to write their name properly. One is professor in solid state physics and the other is professor in Geology and ecology.

The program:

Thursday 15/11/2012:

Landing at Hanoi airport of 3 French's, Join Ha Long city for 4 french+1 or 2 Vietnamese colleagues,

Goal: Installation of two instruments on the roof of the Institute for the environment (Ha Long city) in the afternoon (about 15h), after having a rest at the hotel for the French...



Details of the experiment:

-collection of the PM 2.5 (10 l/min), with changes of the filter every 12 hours (day / night), for 5 consecutive days. We need to train one (or two) local operators for the change of the

filter and the maintenance of the system. They will conduct the experiment while we are on the boat. After, we will set up definitely the protocole and they will continue.
-collector of PM 2.5 (4 l/min), 1 cycle of 12 hours for comparison.



Sommaire
Contenu

15/11/2012

- Arrival in Hanoi and later in Halong city!
- Meeting in the department of Natural Resources and Environment at 14h
- Start of the installation of a fixed station on a roof. It will contain a PM2.5 filter using a UR6 shunt and operating at 10 l/min. At the start, the 48 l/min will work in parallel.
- For the installation, a stick is fixed on the roof. Electricity is brought from an office. All the setup are mounted. The inspector will not be installed tonight...

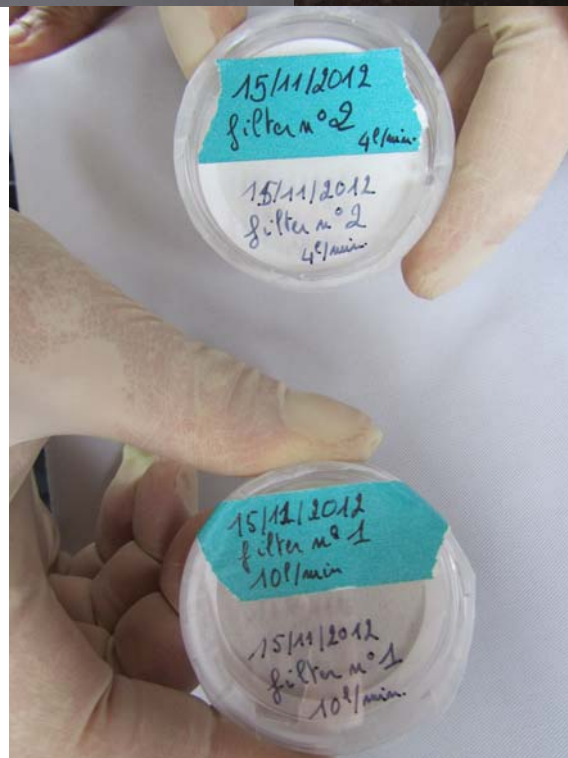
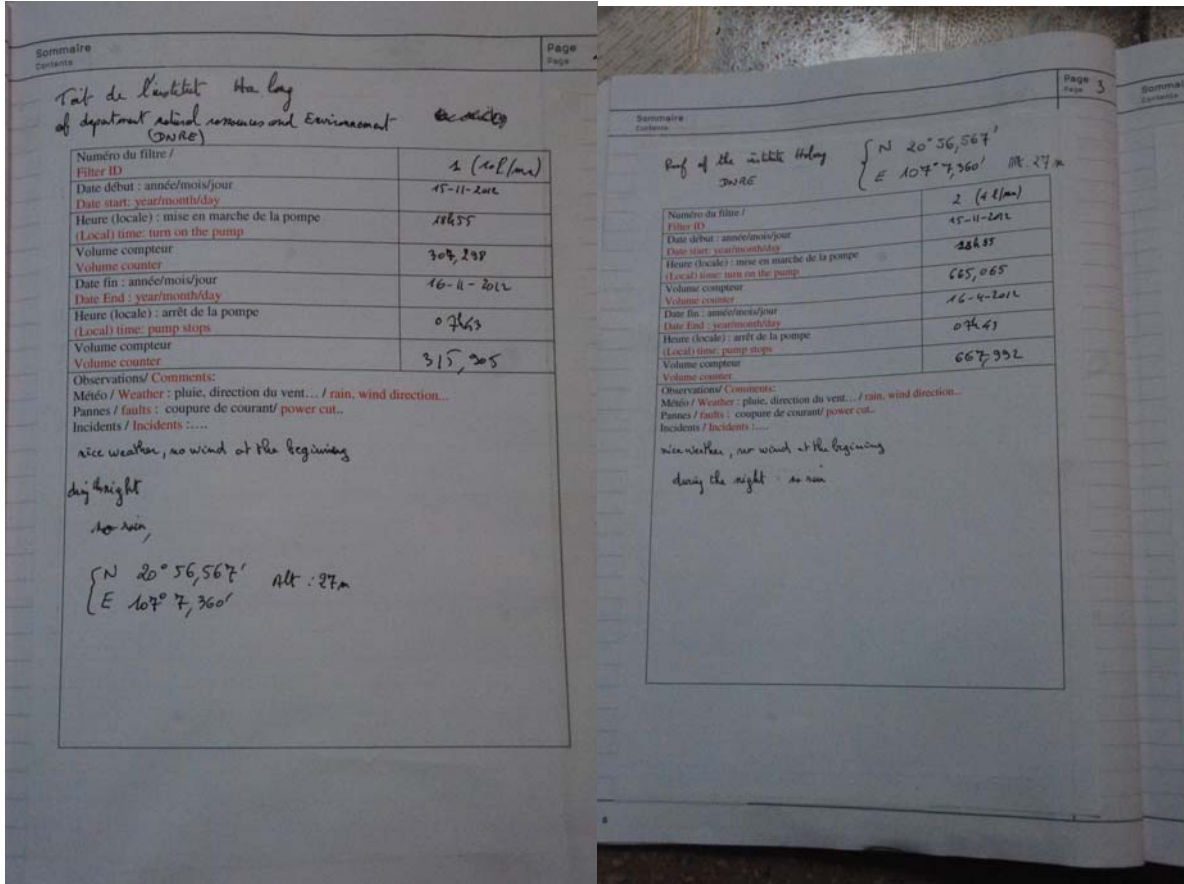
□ Localisation of the building:

Friday 16/11/2012:

Goal: to check the roof experiment and to do the first mine experiment.

Details:

-early morning (7:00): check the filters of the two instruments more changes (in the presence of the future local operators), then we take the 4l/min collector for mine and boat experiment.

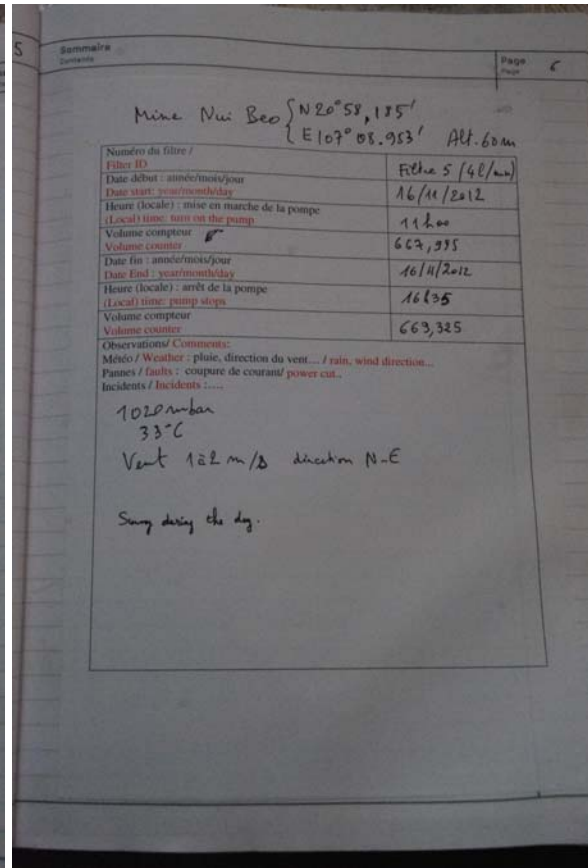
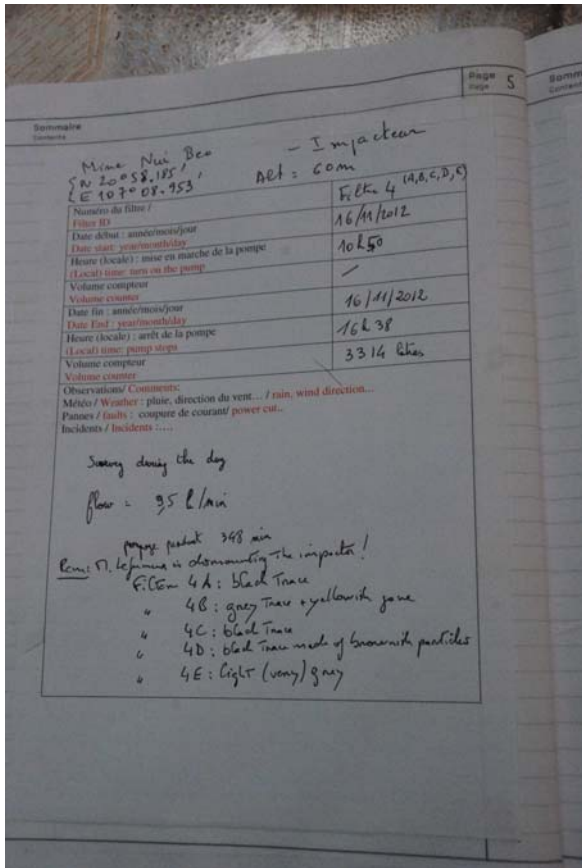


-Afternoon: visit of the mine from Nui Beo and sample in the mine, definition of the spots directly on site.

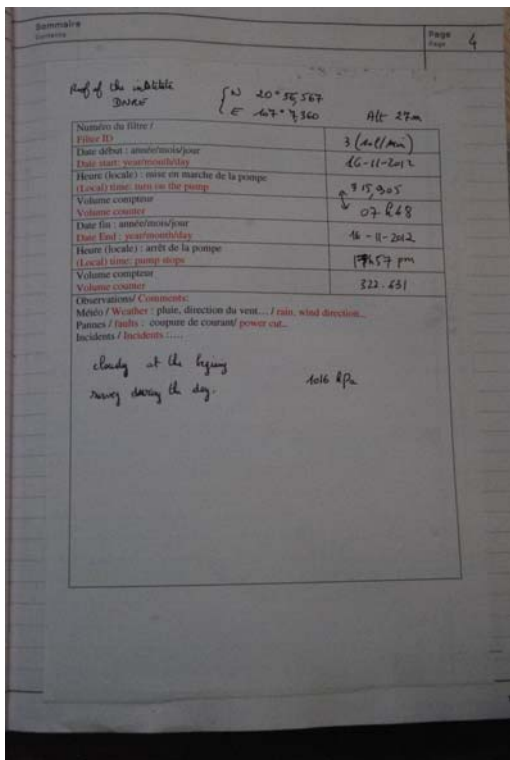


Mine instruments: impactor and collector in PM 2.5 (4 l/min)





-Evening: change of the filter of the collector of the PM 2.5 (10 l/min) (in the presence of the local operators) on the roof.



Saturday 17/11/2012:

Goal: to check the Roof experiment and prepare the local operator for the 3 next days, and move to the boat and start the boat experiment. One french is landing at 6:30 at Hanoi, transport directly to the junk of Ecotourism.

Details:

-early morning: change of the filter of the collector of the PM 2.5 (10 l/min) (in the presence of the local operators)

7

Summary
Résumé

Ref of the Table
DNE

Impactor

Page
Page 8

Numero du filtre / Filter ID	Filter 7 (6.4.2012)
Date debut : année/mois/jour Date start : year/month/day	16-11-2012
Heure (locale) : mise en marche de la pompe (Local time : time on the pump)	18h58
Volume compteur Volume counter	~ 8.136 l/min
Date fin : année/mois/jour Date End : year/month/day	17-11-2012
Heure (locale) : arrêt de la pompe (Local time : pump stops)	11h52 AM
Volume compteur Volume counter	

Observations/ Comments:
Météo / Weather : pluie, direction du vent... / rain, wind direction...
Pannes / faults : coupure de courant / power cut...
Incidents / Incidents : ...

Δ débit = 8.6 l/min
Impaction arrêt à 11h52, et fonctionnement à 0h00.
Pas de changement de filtre n°6.
Pas de pluie pendant 348 minutes.

Summary
Résumé

Ref of the Table
DNE

Page
Page 7

Numero du filtre / Filter ID	Filter 6 (6.4.2012)
Date debut : année/mois/jour Date start : year/month/day	16-11-2012
Heure (locale) : mise en marche de la pompe (Local time : time on the pump)	6.02 pm
Volume compteur Volume counter	592.63 l
Date fin : année/mois/jour Date End : year/month/day	17/11/2012
Heure (locale) : arrêt de la pompe (Local time : pump stops)	8.20 am
Volume compteur Volume counter	331.92

Observations/ Comments:
Météo / Weather : pluie, direction du vent... / rain, wind direction...
Pannes / faults : coupure de courant / power cut...
Incidents / Incidents : ...

No Rain



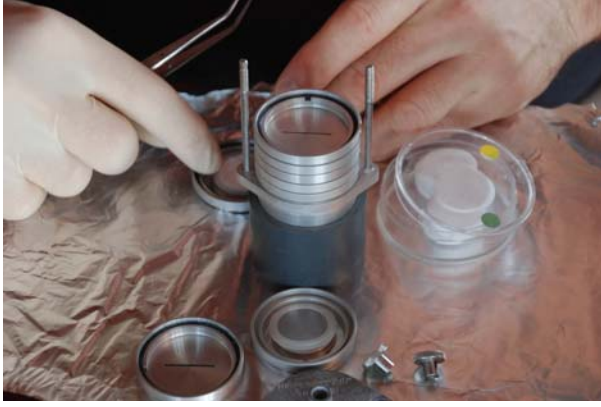
-morning: transport to the boat for 3 days Ha Long Bay tour



- Afternoon: installation and start of the measure with the collector of PM 2.5 (4 l/min), without changing the filter.

- Measurements with the impactor during the whole boat trip.





Sunday 18/11/2012:

Goal: continue the measure as Saturday, and visit of the bay according to the plan of Ecotourism

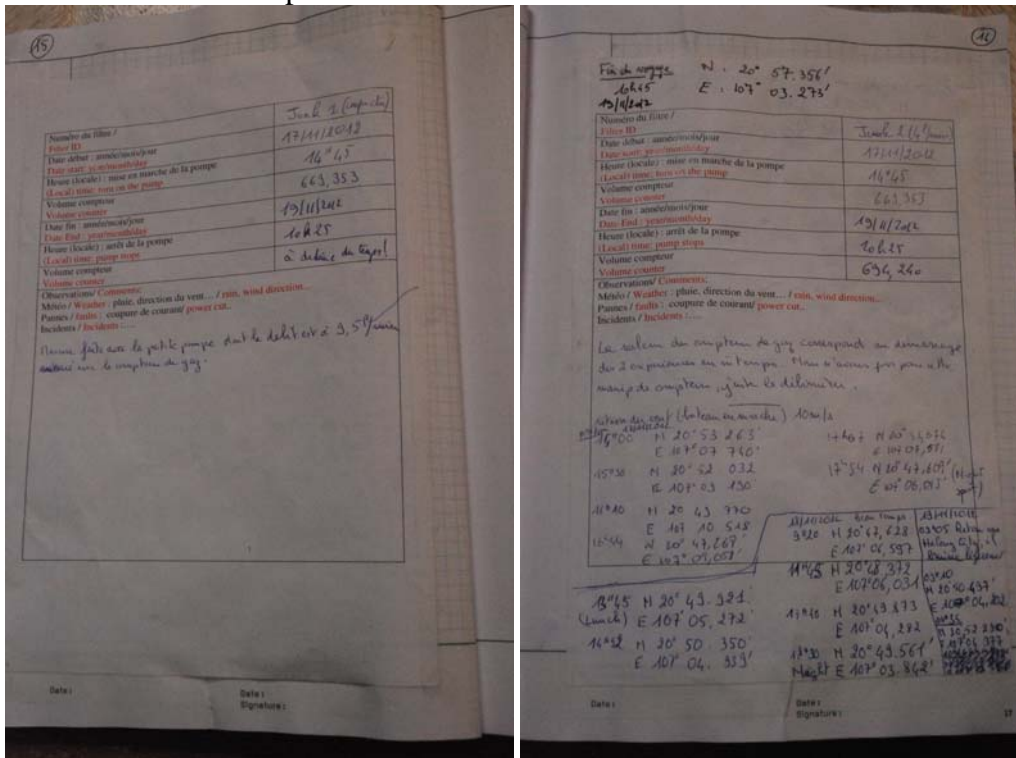


Monday 19/11/2012:

Goal: finish and the boat experiment and check the roof experiment

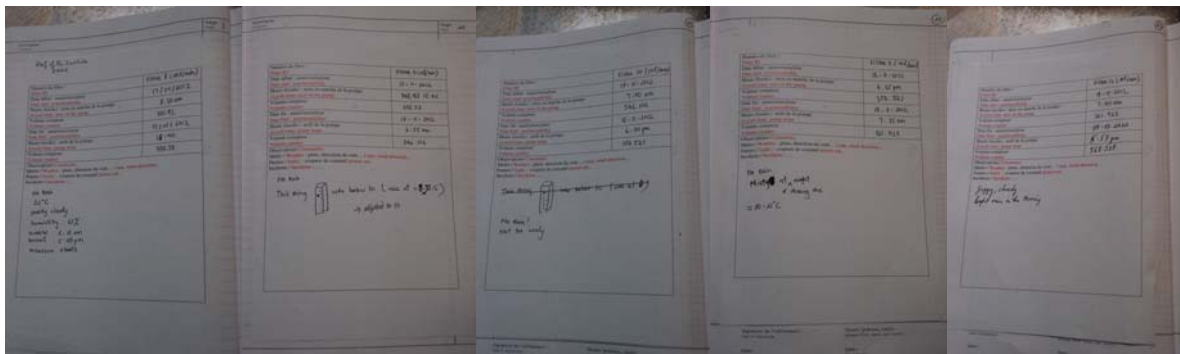
Details:

-Noon: closure of the boat experiment



-Afternoon: transport to Ha Long city

-Late afternoon (evening!): check the Roof experiment with the local operator.



Tuesday 20/11/2012

Goal: check the Roof experiment and start the long-term protocol, return to Hanoi

Details:

-early morning: check and final set up of the Roof long-term experiment

16

Numero du filtre /	Filtre 13
Date debut : amorce/mois/jour	13/11/2012
Date fin : amorce/mois/jour	12/11/2012
Heure (locale) : mise en marche de la pompe	07h25
(Local time: start of the pump)	
Volume compteur	654,240
Volume compteur	
Date fin : amorce/mois/jour	
Date fin : amorce/mois/jour	20/11/2012
Heure (locale) : arret de la pompe	
(Local time: pump stop)	
Volume compteur	
Volume compteur	706,116
Observations / Commentaires:	
Météo / Weather : pluie, direction du vent... / rain, wind direction...	
Pannes / faults : coupure de courant / power cut.	
Incidents / incidents : ...	
Peu de pluie avant le début de l'expérience. (baisse) Temps couvert - vent faible	

Signature de l'utilisateur / User's signature: _____

Signature (preprint, nom) / Signature (first name, last name): _____

Date: _____

Date: _____

17

Numero du filtre /	Filtre 19 (1st/1st)
Date debut : amorce/mois/jour	13-11-2012
Date fin : amorce/mois/jour	17-11
Heure (locale) : mise en marche de la pompe	368.508
(Local time: start of the pump)	
Volume compteur	368.508
Volume compteur	
Date fin : amorce/mois/jour	
Date fin : amorce/mois/jour	20-11-2012
Heure (locale) : arret de la pompe	
(Local time: pump stop)	
Volume compteur	
Volume compteur	377.083
Observations / Commentaires:	
Météo / Weather : pluie, direction du vent... / rain, wind direction...	
Pannes / faults : coupure de courant / power cut.	
Incidents / incidents : ...	

Signature de l'utilisateur / User's signature: _____

Signature (preprint, nom) / Signature (first name, last name): _____

Date: _____

Date: _____

-Morning: visit to the mine from Nui Beo and sample in the mine, at a new spot, depending of the first sample condition (rain, wind...).



Flux Nui Beo (2) (Autre emplacement)

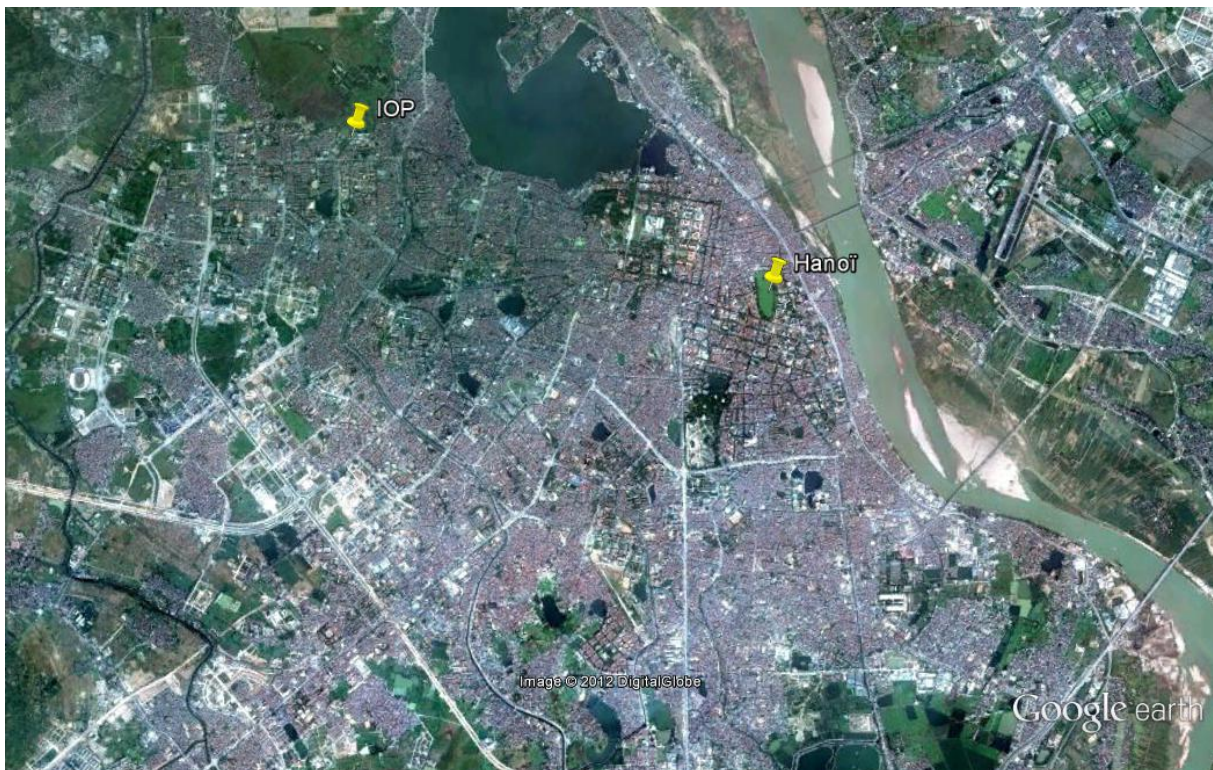
Número du filtre / Filter ID	Flux Nui Beo (2) (4 litres)
Date début : année/mois/jour Date start: year/month/day	20/11/2012
Heure (locale) : mise en marche de la pompe (Local) time: turn on the pump	03h46
Volume compteur Volume counter	—
Date fin : année/mois/jour Date End : year/month/day	20/11/2012
Heure (locale) : arrêt de la pompe (Local) time: pump stops	13h51
Volume compteur Volume counter	—
Observations/ Comments: Météo / Weather : pluie, direction du vent... / rain, wind direction... Pannes / faults : coupure de courant/ power cut... Incidents / Incidents :	
Il y a eu un arrêt de la pompe pendant 5 minutes. Volume pompé : 4 heures x 60 = 240 minutes x 4 l/min = <u>960 l</u>	
Position GPS	
N : 20° 57,738'	Altitude : 60m
E : 107° 08,163'	



-Afternoon: return to Hanoi

Thursday 22/11/2012

Measure on the roof of the IOP Institut





Hana : Roof IOP

Hana : Roof IOP

Impacteur.

Número du filtre / Filter ID	f. filtre Hana 2 (9,5 l/min)
Date début : année/mois/jour / Date start: year/month/day	22/11/2012
Heure (locale) : mise en marche de la pompe (Local) time: turn on the pump	15h00
Volume compteur / Volume counter	704,116
Date fin : année/mois/jour / Date End: year/month/day	23/11/2012
Heure (locale) : arrêt de la pompe (Local) time: pump stops	17h45
Volume compteur / Volume counter	710,536

Número du filtre / Filter ID	f. filtre Hana 2 (9,5 l/min)
Date début : année/mois/jour / Date start: year/month/day	22/11/2012
Heure (locale) : mise en marche de la pompe (Local) time: turn on the pump	15h00
Volume compteur / Volume counter	704,116
Date fin : année/mois/jour / Date End: year/month/day	23/11/2012
Heure (locale) : arrêt de la pompe (Local) time: pump stops	17h45
Volume compteur / Volume counter	718,377

Observations/ Comments:
 Météo / Weather : pluie, direction du vent... / rain, wind direction...
 Pannes / faults : coupure de courant/ power cut...
 Incidents / Incidents :

Observations/ Comments:
 Météo / Weather : pluie, direction du vent... / rain, wind direction...
 Pannes / faults : coupure de courant/ power cut...
 Incidents / Incidents :

Tâche de l'IOP
 Le volume du compteur a été pris sur l'autre manivelle mais on a commencé au même temps.
 La pompe 4 l/min a travaillé pendant 26h45: 1605 min ce qui correspond à 6420 l d'air pompé.

$$\text{Volume capté} = 704,116 + 6,42 = 710,536 \text{ l}$$

 ⚠ Il a plu pendant la nuit (averse courte).

Il a plu pendant la nuit (averse courte)

Tuesday 27/11/2012

First Filter Pictures send from Ha Long City

⚠	
Número du filtre / Filter ID	Filter 15 (40l/min)
Date début : année/mois/jour / Date start: year/month/day	20-11-2012
Heure (locale) : mise en marche de la pompe (Local time: turn on the pump)	08 ^h 13
Volume compteur / Volume counter	377,088
Date fin : année/mois/jour / Date End : year/month/day	23-11-2012
Heure (locale) : arrêt de la pompe (Local time: pump stops)	18 ^h 05
Volume compteur / Volume counter	406,155
Observations/ Comments: Météo / Weather : pluie, direction du vent... / rain, wind direction... Pannes / faults : coupure de courant/ power cut... Incidents / Incidents : ...	
<p>⚠ This is the first filter for weekly experiment. In order to not collect too much acrobis, the pump will work 15 mins every hour only. - heavy rain 1 day.</p>	
Signature de l'utilisateur / User's signature	Témoin (prénom, nom) / Witness (first name, last name)
Date:	Date: / Signature:

