

Atmospheric Pollution Seminar

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As the twentieth century draws to a close, Earth's inhabitants are faced with the challenge of the Environment that sustains them. Mankind clearly needs to learn to live more sustainably and with less impact on the surroundings.

Foremost among the parameters it is claimed that mankind is effecting is the climate of the planet. This basic parameter knows no borders. A small island state like (Malta or) Gozo is clearly very vulnerable to changes in weather patterns, overall temperature and possible changes in sea level due to the effects of climate change on the polar ice caps. The latest indications are that the Antarctic ice cap is already being effected with the result that icebergs of unprecedented size are forming and melting.

There is also the question of local pollution from industry and the ubiquitous internal combustion engine, which we all rely on to get around.

This seminar was organized by the University of Malta in order to bring together all those researchers both locally and internationally involved in such work, to further an awareness of the work among the local population, and at the same time enable the participants to plan further research programs for the Mediterranean.

The seminar was very appropriately held at L-Imgarr Hotel in Gozo where work on Ozone and Carbon monoxide background levels has been carried out for the past three years.

The keynote speaker was Professor Paul Crutzen, 1995 Nobel Prize Laureate in Atmospheric Chemistry. Paul is the director of the Max Planck Institut für Chemie in Mainz, Germany. He is Dutch but has worked and travelled all over the world in the past thirty years. He is the author of the famous book on the "Nuclear Winter", a theory of what would happen if the two superpowers ever exchanged nuclear weapons. At the seminar Paul explained in a very lucid manner what the effects of the OH radicals and ozone actually are. These two components,



although present in a very low concentration in the atmosphere, are the determining factors in atmospheric chemistry. The ozone story is quite a complex one as stratospheric ozone and tropospheric ozone do not readily mix.

We are indeed talking about two separate phenomena that have a subtle long-term interaction, which, however, is crucial to our understanding of atmospheric chemistry. It is this effect that is being changed by the influence of mankind. The influence is a long term one; if pollution by, say, CFC's is completely stopped now it will take another 20 - 30 years before the effect of these on the ozone layer in the stratosphere stabilizes and starts to decrease.

Professor Crutzen's lecture was followed by Dr H. Gusten's of the IMK, Karlsruhe. Dr Gusten explained in detail how photochemical smog in cities occurs. This is very dependent on primary air pollution (SOX, NOX, CO, VOC's etc) and the transportation of these together with the effect of sunlight to enhance the photochemistry in question. The products of this photochemical cocktail are both a health hazard and of economic significance. Among the many effects are eye irritation, discomfort and fatigue, damage to vegetation and crops and damage to organic material (rubber, paints). It appears that the concentration of tropospheric ozone over the populated areas of Europe and North America has doubled during the last century and is currently increasing at an annual rate of around 1%.

Following Dr Gusten, Mr Michael Nolle, who has

registered for a Ph.D. at the University, presented the group's work on tropospheric ozone. These measurements are being carried out at Giordan lighthouse on Gozo. Commonly known diurnal variations are observed; however some unexpected phenomena have also been seen such as a double peak in Spring and Autumn and ozone blips possibly due to contamination from the oil refinery and oil wells in Sicily.

Work is in hand to confirm these findings and add Carbon Monoxide readings to the picture.



Prof. Paul Crutzen and
Rector Prof. Roger Ellul Micallef

CO and Ozone measurements have also been carried out close to the main arterial Mgarr road at the Gozo Centre and the school at Victoria. Traffic is clearly a problem and is the cause of most of the photochemical smog on Gozo in the area.

Further work is planned and includes particle emissions in areas where there is heavy traffic. Vertical profiling of ozone concentrations will also take place using a balloon or kite to raise an instrument package up to 1 km above Gozo's surface. Michael's lecture was followed by Dr Alfred Micallef who has just completed his Ph.D. at Nottingham University and at this meeting presented his results on the modelling of particle measurement campaigns on city streets. The work will be very useful locally when modelling of our own local measurement results is undertaken

Continuing on the same topic Dr Adriana Vella of the Biology Department presented her results on the

effects of this particulate pollution on health. It is clear that this kind of work will increase in importance and will become vital to our understanding of the effects of airborne pollutants on our health.

The morning session was ended by the last lecture from Mr David Bugeja of the Department of the Environment. The EPD is responsible for official monitoring work in urban areas. Some results for the more congested areas were presented. Much work clearly needs to be undertaken to document the urban areas of the Maltese Islands.

The afternoon session started with Dr Nickovic's presentation regarding the modelling of Saharan dust transport. This work is taking place at the FIS in Malta and the EU funded this particular project over the last couple of years. This has resulted in the establishment of a dust forecasting system for the Mediterranean region.

Professor Alfred Vella next spoke about his recent research work on SO₂ and aromatic hydrocarbons at various localities in Malta. It is alarming to note that levels of such compounds are several times higher than recommended WHO limits. Clearly more work needs to be done and action taken to reduce such levels.

The next lecture was one with a difference as Architect Mariello Spiteri who runs an Environmental Planning Consultancy Firm berated the Maltese Government for its amateurish approach to planning and the self inflicted conflicts of interest that continually arise in the planning field. A lot of food for thought here.

The next speaker, Dr L. Korugic was unable to attend the seminar for personal reasons. She, however, sent one of her students to read her paper in her place. Anne Marie Pace gave us some excellent examples of how plastics processing produces

contaminants in the atmosphere.

Mr James Sacco from the Pharmacy Department of the University next gave us a very enthusiastic lecture on the relationship between blood level concentrations and atmospheric concentrations of the same. The blood level concentrations of most locals are much higher than the European average, which, it is suggested, is due to traffic density. It was suggested that lead in petrol is responsible for most of the 12 - 23% of lead in blood; an increase of 1.6 times over a period of ten years.

Ms Maria Attard of the GIS Laboratory then lectured us on the use of Geography Info Systems technique to urban problem areas related to traffic pollution and congestion. This will help in identifying such areas and assist planners to avoid the same.

Dr Micallef finally gave us a second lecture on a model called FUELFAC, which is used to estimate the fuel consumption for motor vehicles in various situations. This model should enable us to create detailed fuel consumption maps for road networks and assist us in reducing the fuel wasted by avoiding bottlenecks.

The final paper by Professor E Mallia was not given due to lack of time and his unavoidable absence from the Island. It would have been a very interesting one as Professor Mallia has actually constructed two working electric vehicles, which have the potential of reducing noise and pollution levels on our roads to practically zero. Such vehicles exist and require only commercial application.

Our thanks go to our sponsors, namely the German Embassy, the local conference unit of the University and the Ministry of Gozo all of whom contributed financially so that registration fees could be kept as low as possible.