VIETNAM

Introduction

National Hydro – Meteorological Service of S.R. Vietnam (NHMS) have 3 ozone and UV-B observing stations. The observation is carried out since May1992 in Hanoi station ($21^0$01'N, $105^0$51'E). From 1994, Sapa station (22^o21'N, 103^o49'E) and Tan Son Hoa station (10^o47'N, 106^o42'E in Ho Chi Minh City) also start observing regularly. All the management for the ozone and UV-B observation in NHMS is operated by the Aero – Meteorological Observatory (AMO).

Observational Activities

The Total amount of atmospheric ozone (TO3) and UV-B are measured by M124 filter instrument, manufactured in Russia. The TO3 is measured 7 times per day with the sun height is in between 20^o and 70^o . The UV-B is measured 11 times per days from 7h to 17h LT (within period of 1st May to 31st October), and 9 times per day from 8h to 16h LT (within period of 1st November to 30th April).

From 2002 to 2005, AMO have sent all M124 for calibration in GGO (Petersburg, Russia) 2 times, in July 2002 and in September 2004. Since the new filters of M124 were not available, so after the calibration few months, our M124 instruments could not give the data with high quality. Even though, all the 3 stations have to absorb TO3 and UV-B, following the National Guide for observation. AMO have sent 03 more instruments M124 for calibration but only coming September AMO would receive the calibrated one.

Results from observation and analysis

According to the Global Distribution of Total Ozone, measured by satellite, Vietnam is located in the region with the total amount of ozone is changed from 200DU to 300DU (1), minimum in winter and maximum in summer.

From 2003 to 6/2005, as indicated on the Table and Figure 1 the total ozone measured at Tan Son Hoa were changed in between 200DU to 280DU, accept from March of 2005 up to now the TO3 were less than 200. The trend of TO3 was not clear. In 2003 we have seen the maximum value of TO3 was in September (273DU). It seems irregular.

At the same time the TO3 measured in Hanoi was out of limits. AMO has reported to WOUDC the situation of fault data and stopped to submit the TO3 data measured in Hanoi since June of 2003. Only from November 2004 the M124 in Hanoi has been replaced by the calibrated one and the data has been submitted to WOUDC again (table and figure 2)

The TO3 measured at Sapa was out of limits too. The annual trend of TO3 was also opposite compare with the map of Global Distribution of TO3, measured by satellite. Maximum value of TO3 was observed in November or December of the year. The TO3 has been changed without stable trend. It is fault data since the M124 has been defected and only replaced by the newly calibrated one in January 2005. From Jan. 2005 to June 2005, the TO3 changes from 257DU to 301DU, within the limits. The highest value is observed in April 2005.

Table and Figure 1: Annual trend of TO3 measured at Tan Son Hoa.

Month	Year 2003	Year 2004	Year 2005
1	251	234	216
2	247	243	205
3	249	261	199
4	254	263	185
5	257	267	184
6	243	266	183
7	248	269	
8	260	263	
9	273	260	
10	267	256	
11	238	229	
12	241	225	

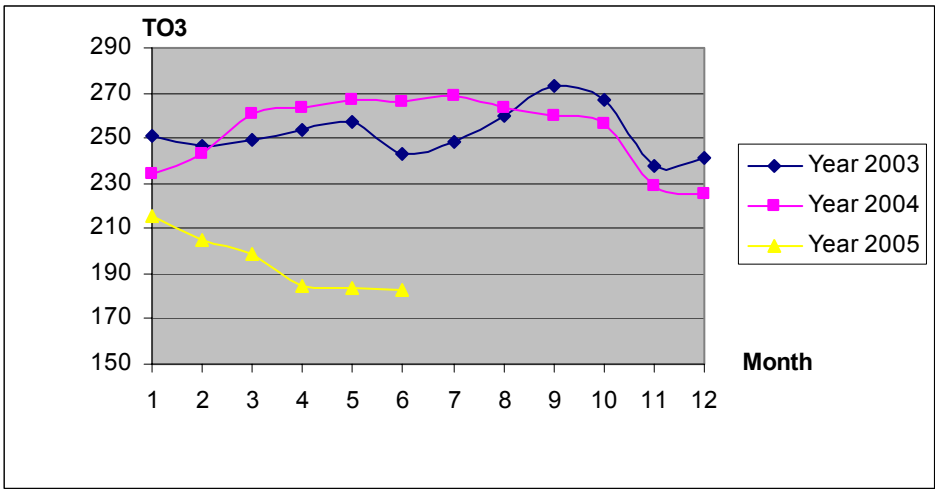


Table and Figure 2: Annual trend of TO3 measured at Hanoi.

Month	Year 2003	Year 2004	Year 2005
1	288	373	274
2	290	390	284
3	322	439	310
4	360	424	310
5	385	454	308
6	417	478	291
7	422	376	
8	377	365	
9	450	314	
10	431	297	
11	431	257	
12	412	267	

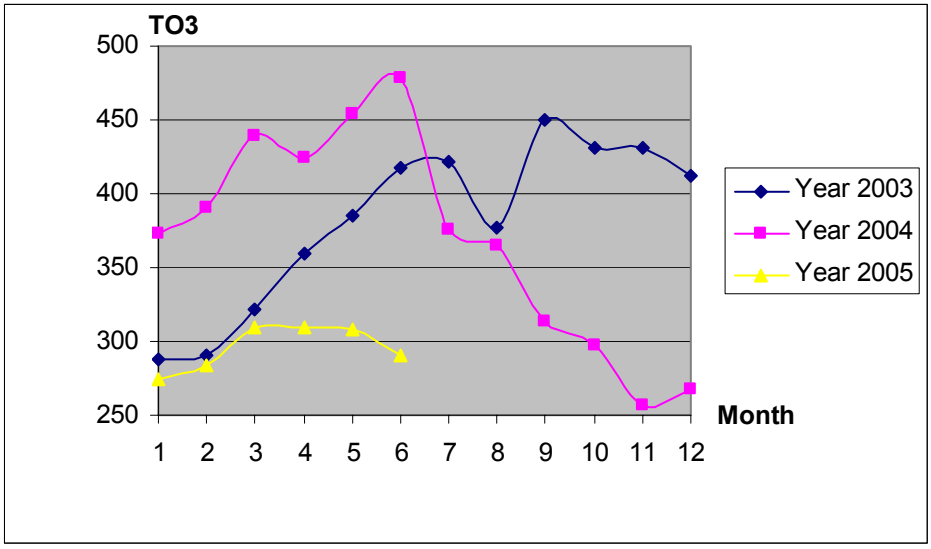
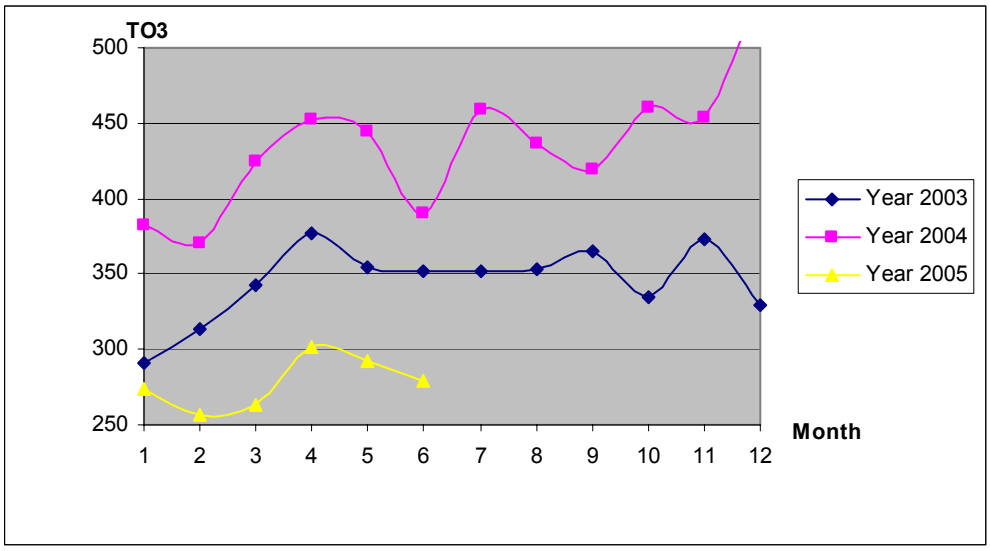


Table and Figure 3: Annual trend of TO3 measured at Sapa.

Month	Year 2003	Year 2004	Year 2005
1	291	382	274
2	313	370	257
3	342	425	263
4	377	452	301
5	354	444	292
6	352	390	279
7	352	459	
8	353	436	
9	365	419	
10	335	460	
11	373	454	
12	330	538	



So, last two years 2003 and 2004 the TO3 data measured in Vietnam has not been qualified due to the fault M124 and we have no budget for calibrating the equipments in Russia every year.

Since the ozone data was not qualified, the UV-B would not qualified too. So the UV-B data would not be reported here.

Projects and collaboration

Since September 2004, in the framework of SOWER/Pacific project, NHMS has been carried out the ozonesounding by ECC ozonesonde once per month. All the equipments needed for observation supported by the project. The on - site training has been conducted by the Japanese experts.

Future Plan

Since the filters of M124 will not be produced NHMS plan to replace the new equipment for ozone and UV-B observation and to continue the international collaboration in this field.

Needs and recommendations

1. NHMS needs the financial support to replace the equipment for measuring the TO3 and UV-B to meet the requirement of the quality of data.

2. NHMS's personnel's need the scientific and technical training and more international collaboration.

3. NHMS needs the financial support for exchange of visits amongst personnel from the monitoring stations of NHMS and other countries for improve our personnel's operational skill and knowledge.

4. NHMS hope to receive the support to carry out the ozonesounding in Hanoi at least once a week since we conduct the radiosounding twice a day by the DigiCORA-RS sonde, manufactured by Vaisala Co., Finland.

Finally, I would like to thank to WMO/UNEP give me opportunity to attend this meeting and give the national report on ozone and UV-B monitoring activities in S.R. Vietnam and NHMS would expect more international support in this field.

References

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