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# OXIDATIVE POTENTIAL OF ATMOSPHERIC PM<sub>10</sub> AT FIVE DIFFERENT SITES OF AHMEDABAD, A BIG CITY IN WESTERN INDIA

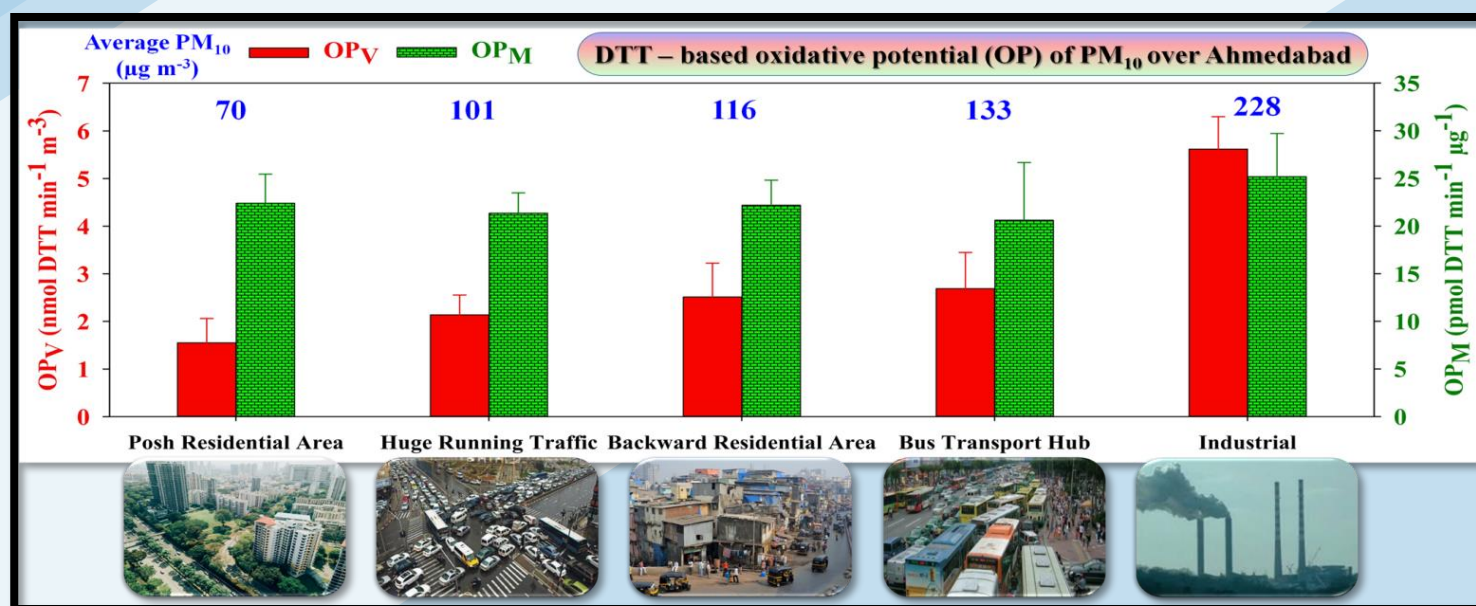
(Anil Patel, Neeraj Rastogi, Utsav Gandhi and Nitasha Khatri)



ANIL PATEL

The current study presents the oxidative potential (OP) along with a wide range of chemical speciation of particulate matter with an aerodynamic diameter less than 10  $\mu\text{m}$  (PM<sub>10</sub>) at five sites representing different environments in Ahmedabad, a big city in western India. On an average, PM<sub>10</sub> concentrations were  $116 \pm 36$ ,  $228 \pm 43$ ,  $133 \pm 29$ ,  $101 \pm 21$ , and  $70 \pm 20 \mu\text{g m}^{-3}$ ; volume-normalized OP (OP<sub>V</sub>) were  $2.51 \pm 0.71$ ,  $5.62 \pm 0.68$ ,  $2.69 \pm 0.76$ ,  $2.14 \pm 0.41$ , and  $1.55 \pm 0.51 \text{ nmol DTT min}^{-1} \text{ m}^{-3}$ ; and mass-normalized OP (OP<sub>M</sub>) were  $22 \pm 3$ ,  $25 \pm 5$ ,  $21 \pm 6$ ,  $21 \pm 2$ , and  $22 \pm 3 \text{ pmol DTT min}^{-1} \mu\text{g}^{-1}$  over Bapunagar (backward residential area), Narol (industrial), Paldi (bus transport hub), Income Tax (huge running traffic) and Science City (posh residential area), respectively. Overall, OP<sub>V</sub> showed a significant linear correlation with PM<sub>10</sub>, whereas OP<sub>M</sub> showed near uniformity with increasing PM<sub>10</sub>. Although the OP<sub>M</sub> values were similar, the site-to-site variability in PM<sub>10</sub> concentration reflects the corresponding health risks associated with PM<sub>10</sub> exposure for the people living in these areas. Further, a noticeable temporal variation in OP<sub>M</sub> at Narol and Paldi suggests that species with diverse OP<sub>M</sub> contributed to PM<sub>10</sub> on different days. A strong linear relationship between the ratio of OP<sub>V</sub> to the mass concentration of organic carbon (OP<sub>OC</sub>) and the ratio of m/z 43 signal to total water-soluble organic aerosols (WSOA) signals (f43) suggests that the fossil-fuel combustion derived WSOA have higher OP. Nitrogenous organic compounds particularly emitted from the traffic-related sources in Paldi and Income Tax have higher OP<sub>OC</sub> than those emitted from other sources over Bapunagar, Narol, and Science City.

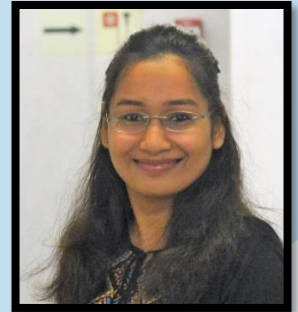
<https://doi.org/10.1016/j.envpol.2020.115909>



Variability of oxidative potential (OP) at five sites representing different environments in Ahmedabad

# NON-REDFIELDIAN C:N:P RATIO IN THE INORGANIC AND ORGANIC POOLS OF THE BAY OF BENGAL DURING THE SUMMER MONSOON

(Deepika Sahoo, Himanshu Saxena, Nidhi Tripathi, Mohammad Atif Khan, Abdur Rahman, Sanjeev Kumar, A. K. Sudheer, Arvind Singh)



DEEPIKA SAHOO

Carbon (C), nitrogen (N) and phosphorus (P) are fundamental elements to all the life forms as these constitute biological structural molecules. N and P are present in a lower concentration compared to C in the surface ocean, thus considered as the limiting nutrients for ocean productivity. In 1934, Alfred C. Redfield observed that the elemental composition of surface bulk organic matter is similar to the deep water nutrients at C:N:P :: 106:16:1. This ratio is referred today as the Redfield Ratio and considered as the cornerstone in ocean biogeochemistry. However, recent studies have challenged the concept of the Redfield Ratio, and its veracity remains to be examined in oceanic basins like the Bay of Bengal. For this purpose, we sampled the water in the Bay of Bengal for C, N, and P content in the organic and inorganic pools from the surface to 2000 m and to understand the role of biogeochemical and physical processes on the variation in elemental proportions. The C:N:P ratio in particulate organic matter varied from 232:25:1 in the top layer (surface to the depth of the chlorophyll maximum) to 966:72:1 in the deep water (300–2000 m). In dissolved organic matter, the ratio varied from 357:30:1 in the top layer to 245:66:1 in the deep water. The N:P ratio in nutrients varied from 3 in the top layer to 12 in the deep water. Overall, the C:N:P ratio deviated greatly from the Redfield Ratio. Measured N<sub>2</sub> fixation rates were not sufficient to alter the observed C:N:P ratio in particulate organic matter. Eddies showed a mixed effect on the C:N:P ratio in the top layer.

<https://doi.org/10.3354/meps13498>

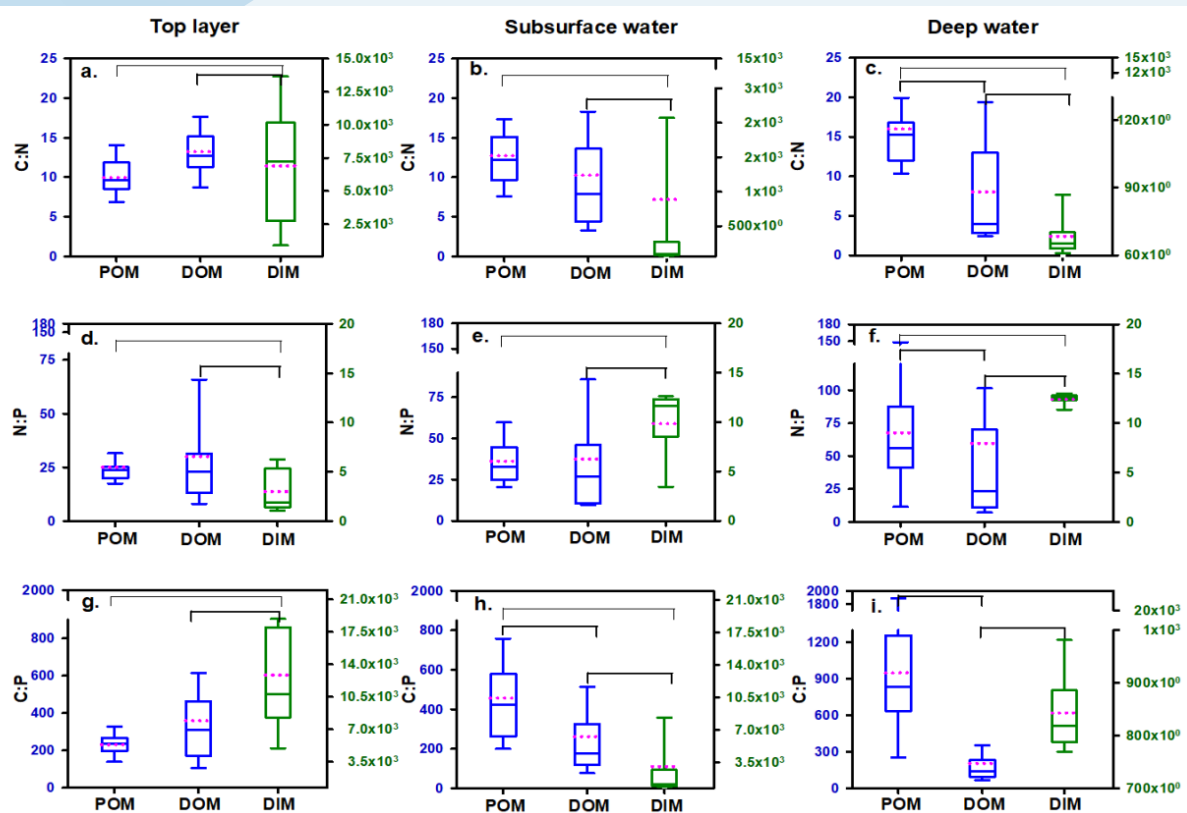


Figure: C:N, N:P, and C:P ratios in top layer, subsurface water, and deep water. Pink dotted lines: mean; blue (POM, DOM: particulate organic, dissolved organic matter, respectively) and green (DIM: dissolved inorganic matter) solid lines: median.

# 150<sup>TH</sup> BIRTH ANNIVERSARY OF MAHATMA GANDHI



150<sup>th</sup> Birth Anniversary of our Father of nation, Mahatma Gandhi's was celebrated amidst Covid-19 Pandemic restrictions in PRL. On this auspicious occasion, by following all COVID-19 prevention guidelines at workplace, the Director, PRL, Registrar PRL, Chair, PPEG, Heads of various Divisions and other staff members have offered their remembrance and paid floral tribute to Mahatma by offering prayers and a minute silence.

Further, to commemorate his 150<sup>th</sup> birth anniversary, a specific area in the Auditorium foyer was dedicated to the Mahatma, where a photograph along with his autobiography in English/Hindi and Charaka were kept as a permanent display.

Mahatma Gandhi's principles of truth, non-violence and love that paves the way for the welfare of the Society and world at large by bringing equality and harmony.

In commemoration, an online Quiz Competition was organised, on the Monday 5<sup>th</sup> of October at 02.00 pm. Ms. Ankita Patel stood first and Mr. Yogesh the second and Mr. Chintan D Vasava the third in the event.



## WHEN YOU REALISE, LIFE IS A BLISS



PAULINE JOSEPH  
FORMER SR. A.O., PRL

When I decided to take up a job after my superannuation, to keep my ever-wandering mind at ease and to keep myself physically active besides earning some extra money for my unstoppable desires, it met with no much obstacles except a quiet warning to be cautious at every step.

When I was offered a reasonable position in a pharmaceutical sourcing company as its In-charge, I accepted it joyfully. The boss being a young enthusiastic guy, had immediate and immense faith in me. After completing orientation, I swam into my new world with all the enthusiasm and energy of a teenager. And after barely two months, came the Corona Virus scare. Lock down was completely observed and team spirit was kept up with the group on a regular basis. After lock-down was lifted, we opened the office with all the precautions in place, complete office sanitization, short listing of visitors and their health records, distribution of Vitamin C and other health check-ups and we won it all before we realized that the Boss's family had contracted corona virus. RT-PCR of our staff revealed that all of us were COVID negative and we were proud of the fact that we have strong immune system and our precautionary measures are in place. In the first week of October 2020, when a team member met with an accident and as mandatory, COVID test was taken, he was positive, of course asymptomatic. While this young chap was shifted to a government hospital for COVID treatment, another team member tested positive and here my world went numb; the thought

that I am a feisty senior citizen no longer charmed me! On doctor's advice, I isolated myself on our 1<sup>st</sup> floor house while my hubby kept himself restricted to the 2<sup>nd</sup> floor. On the 4<sup>th</sup> day, as there were no symptoms, we decided to go for HR-CT and were declared COVID negative. My heart was singing looking at my husband's sweet smile. The happiness did not last long, as in the evening; I came up with a low-grade fever. Doctor advised that since COVID was almost ruled out, to start with the antibiotics. With fever refusing to subside, I decided to go for blood investigation for both of us. D-Dimer digits showed possibility of COVID looming largely for my husband. The burden of contracting him COVID weighed me down heavily, scared for life, panic gripped me totally. The next morning RT-PCR was done and, in the afternoon, both of us tested corona positive. Kids, family and friends' support did not get me high but my husband's ever smiling face saying that we will fight it together helped me!

Admitted to a COVID exclusive hospital and the treating doctor explaining to us that corona stays in your body for 15 days, it is unpredictable, it can ascend, damage, was not reassuring; yes, he had to tell us! Our COVID recovery journey with CT Scan, 2D Echo, changes of IV administration, low doses of steroids, various injections, blood thinners, insulin were reminders that we were borne to endure all difficulties. Prayers, inspirational teachings of Sadhguru, Brahma Kumaris, Jai Swaminarayan and auto-suggestions rang in my ears through-out. Trying to be cheerful to the outside world was bit difficult but had to for the sake of endless love and affection poured in from outside.

A Sojourn of 9 days at the hospital with the COVID Front Line Workers tirelessly on their toes was warming to the heart. Highest salutation to the Team for our lives from the bottom of our Hearts. No thank you and gratitude is enough for the front-line workers who put their lives at risk for all of us.

When we were discharged with the D-Dimer count of 220 [0-500] for both of us, we were happy to be back to our Nest of Love and Happiness. With all the endless love and support from doctors, family and friends, a divine feeling sinks in "been worth living" in times of Corona!

## COLLOQUIA

- **Dr. Neeraj Srivastava** (*Assistant Professor, PSDN, PRL*) delivered a colloquium titled as *“Discovery of Recent Volcanism on the Moon”* on 7<sup>th</sup> October 2020.
- **Dr. Mudit Kumar Srivastava** (*Assistant Professor, A&A, PRL*) delivered a colloquium titled as *“Search for Symbiotic Systems: The ASTROSAT Revelation”* on 21<sup>st</sup> October 2020.
- **Prof. Bobby K Antony** (*Professor, Department of Physics, ISM Dhanbad*), delivered a colloquium titled as *“Electron and positron scattering from molecules”* on 28<sup>th</sup> October 2020.

## AWARDS AND HONOURS

- **Dr. Vineet Goswami**, (Assistant Professor, GSDN) has been selected as one of the members of the Scientific Steering Committee (SSC) of the international GEOTRACES Program.
- **Dr. Kuljeet K Marhas**, (Professor, PSDN), has been nominated as a Member of the Scientific Program Committee of Geochronology Facility at Inter-University Accelerator Centre (IUAC), New Delhi.
- **Dr. Ravi Bhushan**, (Professor, GSDN) has been inducted as a member of Research Advisory Council (RAC) of Birbal Sahni Institute of Paleosciences (BSIP), Lucknow.

WE CONGRATULATE ALL THE PRL MEMBERS FOR THEIR WELL DESERVED HONORS AND WISH THEM ALL THE BEST FOR THEIR FUTURE ACHIEVEMENTS

## SUPERANNUATION



R. A. JANI

Shri R.A. Jani, Scientist/Engineer-SE superannuated from PRL on 31.10.2020 after serving the institute for nearly 36 years. PRL family thanks him for his contributions towards the betterment of the institute and wishes him a happy and healthy superannuated life.

## HEARTY WELCOME TO NEW MEMBER



DINESH YADAV  
SCIENTIFIC ASSISTANT

## OBITUARY



**Late Shri T.M. Raval**  
**Engineer-SB**

Date of Birth	28.07.1932
Date of retirement	31.07.1992
Date of Death	14.10.2020



**Late Shri Atmaram V Panchal**  
**Senior Technician-B**

Date of Birth	10.07.1943
Date of retirement	31.07.2003
Date of Death	14.10.2020

We mourn the demise of our former employees and fondly remember their contributions to PRL. We pray for the well-being of the bereaved family. May the departed souls rest in peace.

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