



PLANETARY BOUNDARIES X CREATIVE INDUSTRIES

Stratospheric Ozone Depletion X Paper and Literature Industry

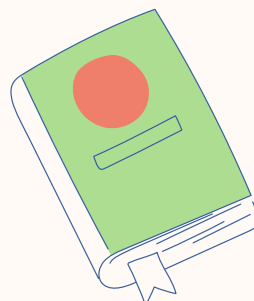
By Chiara Sibaldi



INTRODUCTION

For at least four decades, environmentalists have been raising attention about anthropogenic chemical perturbations to the ozone layer. Starting in the mid-70s, extensive research has been carried out with regard to chlorine radicals. Indeed, in the 70s and 80s a number of scientists focused their efforts in researching chlorine-induced ozone depletion, mainly due to concerns arising from supersonic aircrafts flying in the stratosphere and the chemical substances created from rocket propulsion (exhaust) (Portman and Ravishankara 2012, 1156). More specifically, Rowland and Molina began studying the effects of chlorofluorocarbon (CFCs) in the atmosphere, demonstrating how such substances were responsible for the breakdown of large amounts of ozone. The environmental implications of such discovery was that, since the ozone shield in the Earth's stratosphere absorbs most of the ultraviolet-B (UV-B) radiation reaching the planet, depletion of the ozone layer caused by CFCs would lead to an increment in UV-B radiation at the Earth's surface, which in turn would cause an increase in environment related concerns and human skin diseases such as skin cancer. The discovery of the ozone hole in 1985 by Farman, Gardiner and Shanklin in 1985 accelerated research on the effects of chlorine on stratospheric ozone. It soon became clear that the time was up for preventing the depletion of the ozone layer, as such phenomenon was, by then, a present reality.

The research findings where, as expected, met with scepticism and resistance by those industries that profited from the production and use of CFCs. Nonetheless, in 1987 the United Nations ratified the Montreal Protocol on Substances that Deplete the Ozone Layer, a milestone agreement that has successfully reduced the global production of the substances that deplete the Earth's' ozone layer. Recent studies show that continuing on the previous path would have eventually caused the complete breakdown of the ozone layer and even greater impact on our global climate (Portmann and Ravishankara 2012, 1158).

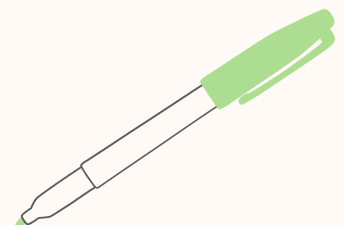


THE IMPACT OF PAPER MANUFACTURE ON STRATOSPHERIC OZONE DEPLETION

Although a significant amount of research has been carried out on the environmental implication of the paper industry on water, land and air pollution, limited information is available on the direct impact of the paper industry on the ozone layer. When it comes to directly ozone-depleting substances in the manufacturing of paper, solvents are widely considered to have a direct link between the manufacturing of paper and ozone depletion. In fact, solvents that contain fluorinated greenhouse gases have a high potential of causing ozone depletion and are therefore restricted. In his book, Case describes how, especially in the 1990s, efforts have been put in phasing out certain substances used in the manufacture of paper, these including the aforementioned chlorine and sodium hypochlorite which are toxic, ozone depleting chemicals and to produce chlorine-free pulps (Case 2000, 201). In the past, chlorine and compounds of chlorine were used in the bleaching of wood pulp; the use of such substances has now been substantially reduced. Yet, as described by Staley and Jennervik in their report on Ozone Depleting Substances in the solvent sector in China, tackling and phasing out the use of ODS is still considered a challenge, because of the extensive use of such solvents at small and medium size enterprises. (Staley and Jennervik 2005, 11).

IMPLICATIONS OF PRINTING

When analysing the interdependence between stratospheric ozone depletion and the literature industry, the impact of printing on the ozone shield may also be taken into consideration. With respect to that, Carbon tetrachloride and trichloroethane (cleaning solvents often used by printers) are regulated because they are ozone-depleting substances. Considering that harmful air emissions need to be eliminated or at least reduced, a thorough examination of what printers are releasing into the air must be carried out. Ideally, printers should use low-alcohol fountain solutions with low-VOC (volatile organic compounds) substitutes, these include soaps and detergents. Automatic blanket washers may also help decrease the overall solvent use and emissions caused by ODS. Furthermore, VOC emissions from inks must also be addressed by switching to lower-VOC formulations, e.g. water-based inks or inks made with soy or vegetable oils. (Guyer 1998, 395).





INDIRECT IMPLICATIONS OF THE PRINTING INDUSTRY ON STRATOSPHERIC OZONE DEPLETION

After having provided an overview on the direct negative implications that ODS have on the ozone layer, we may briefly consider the “indirect” negative impacts of the pulp and paper industry on the stratospheric ozone depletion. Large CO₂ emissions throughout the whole supply chain in the paper industry indirectly amplify chemical processes in the stratosphere that debilitate the ozone layer’s ability to recover. While the chemical compound does not have a direct impact on the ozone layer, unlike the ODS, a number of papers suggest that it slows down the production of ozone in the stratosphere, therefore aggravating the negative impact of other chemical agents produced by the pulp and paper industry (Stolarski et al 2015). In addition to this, to improve the sustainability performance of the literature industry it is also crucial to stress the need of reducing virgin fibres and increasing the use of recycled/recovered fibres, thereby reducing the need to cut down trees which can contribute to ozone depletion (European Commission 2019, 11).



CONCLUDING REMARKS

This research has provided a brief overview of some of the issues the literature industry must deal with at the scope of achieving urgent goals pertaining to sustainability and the protection of the ozone layer. The Berlin-based Lissome Magazine provides us with an example of how the paper industry could improve its environmental performance: the magazine is printed locally and it partners with Medilis, a FSC certified printing company. The pages are made of Enviro Top U, a 100% FSC recycled paper which is Blauer Engel and EU Ecolabel certified. Despite some improvements that can be observed in the industry, further research must be carried on the ways the paper sector still impacts the stratospheric ozone. Awareness on the environmental footprint of this industry must be raised, as the literature industry is a largely overlooked one when sustainability issues are discussed.

BIBLIOGRAPHY

- Case, Phil. 2000. Environmental Risk Management and Corporate Lending: A Global Perspective. Cambridge: Woodhead Publishing Limited
- Guyer, Howard H. 1998. Industrial Processes and Waste Stream Management. New York: Wiley and Sons
- Kowalska, Malgorzata, Shane, Donatello and Wolf, Oliver. “Revision of the EU Ecolabel criteria for Paper products, Final Technical Report”. European Commission (2019): 3–99.
- Portmann, R. W., Daniel, J. S., & Ravishankara, A. R. “Stratospheric ozone depletion due to nitrous oxide: influences of other gases”. Philosophical Transactions of the Royal Society B: Biological Sciences, 367 (2012): 1256–1264.
- Staley, Darrel Staley and Jennervik, Ann. “Phasing out Ozone Depleting Substances in the Solvent Sector in China”. Sida Evaluation 05/06, Department for Infrastructure and Economic Co-operation (2005): 5–39.
- Stolarski, Richard S. et al “Impact of future nitrous oxide and carbon dioxide emissions on the stratospheric ozone layer” Environmental Research Letters, 10 (2015).