The atmosphere of our Earth, of planets of our solar system and of exoplanets

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The Atmosphere of our Earth, of Planets of our solar System and of Exoplanets

Peter Brüesch
There are more things in Heaven and Earth, Horatio, than are dreamed of in your Philosophy.

from «Hamlet»
by William Shakespeare
(1564 – 1616)
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Preface

My first Book has been dedicated to the subject of «WATER: Its Significance in Science, in Nature and Culture, in World Religions and in the Universe».

According to the old Greek Philosophers, everything consists of the four basic elements: Air, Water, Earth and Fire. This second Book is dedicated to the element «Air» or more generally to the «Atmosphere». Similar to water, air is indispensable for all human beeings. Water and air in the first place make life on our Planet possible.

In contrast to liquid and solid water (ice), the air of our Earth is invisible. The air layer of our planet is extremely thin compared with the radius of the Earth. Our Atmosphere consists of several gases. Without these gases we would be burned by the intensive heat of the Sun during the days, and during the nights we would freeze because of the very low temperatures.

Although we need air constantly for breathing, we take it for granted. As a consequence, average people are hardly interested about the properties and quality of air. Only if the air is strongly contaminated (by thick smog, by carbone dioxide (CO₂) etc. or by bad odour), the alarm bells are ringing. Clean air and clean water are indispensable for our life.

Several implications associated with «Global Warming» have been discussed in my first Book dedicated to «WATER» and are therefore not repeated in the present work.

I found it necessary to embed each of the different topics into the associated larger context. Only in this way is it possible to generate a well-rounded and meaningful representation.

My last and tenth Chapter contains a survey about the properties and atmospheres of the Planets of our solar system as well as of Planets outside the solar system – the so-called extrasolar Planets or Exoplanets.

With a view exceptions, the Book is written deliberately simple and should be easily comprehensible. Each Chapter contains a large list of References for complementary and more detailed information.

Peter Brüesch January 2016
Acknowledgements

My deep thanks go to the following friends and collegues:

I would like to thank the late Dr. Walter Schneider for many years of support: During a large period of time he sent me highly relevant information from Journals and Books about the present topics.

During many discussions with Mister Peter Etter, I learned a lot about Insects and I am indebted for his highly illustrating demonstration and explanations of his very interesting butterfly collection (Chapter 4, Section 4.2.2). In addition I would like to thank him for his information concerning the smallest insect of the world, the «Dicopomorpha Echmepterygis» (Chapter 4, Sect. 4.2.2, p. 127).

In addition, I would like to thank Dr. Dieter Kuse for his suggestion to include a discussion about «Polar Lights» and the «Kennelly-Heaviside Layer» (Chapter 10, Sections 8.2 and 8.3).

I am also indebted to Professor Dr. Straumann for his information concerning relevant Literature about «Exoplanets» (Chapter 10, Sections 10.3 and 10.4).

Many thanks to Reto Stephan Grimm for providing me with interesting Literature concerning the present «Brake of Climate Change» as well as for information about «Exoplanets».

I am very thankful to Mister Kirkor Arsk for his valuable help related to Data handling and PC support.

Furthermore, I thank my daughters Elisabeth Schraner – Brüesch and Christine Brüesch for Books about Exoplanets from which I have learned a lot about the Atmosphere of Extrasolar Planets. Many thanks also to my granddaughter Angéline Da Silva for helping me correcting a few Chapters of my text.

Last but not least I would like to thank my dear wife for her interest and valuable suggestions as well as for her support and never ending patience during the elaboration of this work.

Peter Brüesch

Peter Brüesch: Scientific Career

1934 Born in Schuls (Scuol) – Graubünden – Switzerland
1948–1954 Academic high school in Chur, Switzerland
1954–1960 Study of Experimental Physics at the ETHZ in Zürich
1960–1965 PhD at the Laboratory of „Physical Chemistry“ at the ETHZ
1965–1967 Postdoctoral Fellowship at the Chemistry Department, Oregon State University, USA
1967–2002 Scientific collaborator and Project Leader at the ABB Research Center – Switzerland
1975 Nominated «Assistant Lecturer» at the Physics Department of the EPFL in Lausanne
1975 Lectures about «Phonons: Theory and Experiment»
1987 Nominated „Professeur Titulaire“ at the Physics Department of the EPFL
1998–2000 Consultant at the ABB Research Center in the field of «Water Technology and Aqueous Solutions»
   - Since 1997: Lectures about „Solid State Physics“ and about „Water“ at the EPFL in Lausanne
   - 2002–2001: Elaboration of a comprehensive work about „Water“.
   - This formed the basis of the following extended Work in German and English:
     „Wasser: Seine Bedeutung in der Wissenschaft, in der Natur und Kultur,
     in den Weltreligionen und im Universum”
     „Water: Its Significance in Science, in Nature and Culture,
     in World Religions and in the Universe”
2011–2015: «The Atmosphere of our Earth, of the Planets of our Solar System and of Exoplanets»

E-Mail: p.brueesch@bluewin.ch
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John Wiley & Sons ; April 2010
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