Dear Readers,

"Clouds – a phenomenon remarkable to every man from his youth up – are, in the plain countries, generally looked upon at most as something foreign, something super-terrestrial. People regard them as strangers, as birds of passage, which, hatched under a different climate, visit this or that country for a moment or two in passing — as splendid pieces of tapestry wherewith the gods part off their pomp and splendor from human eyes." So wrote Johann Wolfgang von Goethe in 1779 in his Letters from Leukerbad. In a similar vein, poets and singers throughout the ages have prized the clouds as heavenly messengers of good and evil.

Neither Goethe nor any other poet before or since could have guessed that clouds would one day be the subject of intense study, and of central significance for science. In every model of the future development of Earth's climate, they play an exceptionally important role. The connection between cloud formation and the global rise in temperature is, in fact, highly uncertain. It is the lack of knowledge of this association that makes most forecasts of climate change appear unreliable. And yet such forecasts are being applied as a basis for far-reaching international treaties that affect the whole of economic and political life in every region of the Earth.

Against this backdrop, it is clearly the task of science to carefully and responsibly present facts that are based on meticulous measurements and observations. Within the German scientific system, the Max Planck Society is tasked with conducting basic research without restriction in terms of purpose, but with an eye to the needs of the public that sponsors us. Thus, institutes that were established long ago are devoted to issues of future importance – like the Max Planck Institute for Chemistry in Mainz, which has been studying the atmosphere for more than 40 years now.

Given that the formation of clouds is triggered by processes of physical chemistry, and that the events taking place within them affect the climate, the institute in Mainz has assumed a leading international role. The same may be said of the Max Planck Institute for Meteorology in Hamburg, where scientists drew attention at an early stage to the importance of clouds for the development of climate models.

But the role of clouds is not limited to the climate. They also exemplify the origination and effects of turbulent processes on a much-extended scale, comparable with ocean currents and alpine avalanches. It is a question of understanding how minor causes can create vast structures that, in turn, are the cause of other turbulent – that is, non-linear – processes. This is the kind of work conducted at, for example, the Max Planck Institute for Dynamics and Self-Organization in Göttingen.

Former Max Planck Society President Hubert Markl once said that, contrary to widely held belief, the rise in CO_2, with its presumed consequences for the climate, was discovered neither as a result of social scientists' surveys or the exegesis of political or religious writings, nor even by Greenpeace and its activists. Rather, the relevant data and facts are gathered, ordered and evaluated by large numbers of scientists, the majority of whom are entirely unknown to the public. The Focus topic of this issue provides insight into their work.

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