This book is about trees, upright woody plants taller than a person, unable to grow in cold conditions where lots of other plants can. What makes trees different from those other plants? What causes them to form an abrupt high elevation boundary that looks like the shore line of a mountain reservoir from great distance? This book will adopt that ‘great distance view’ at a global phenomenon, in an attempt to arrive at its biological explanation.

To understand a global phenomenon, the theory to be developed must not lean on regional peculiarities such as the occurrence of certain taxa, or certain climatic phenomena (such as snow or seasonality) and must not get disguised by disturbances that could occur anywhere. The task is to relate the global low temperature limit of tree growth in mountains to some overarching biological principles. The regionally important modulations of the tree-specific climatic boundary by all sorts of local drivers such as herbivores, lack of substrate, fire, avalanches, landslides, storms can be handled by more regional treatises.

The advancement of science results from a furthering of theory and moving from the particular to the general. Once a field of science has had a century of collecting and compiling data, these data need to be weighted by their curiosity versus their generality in order to lift the mist. As in other fields, treeline research has suffered and still suffers from a rather biased, in this case geographically and phylogenetically biased, sample of data. Because most of the data are for cool temperate conifers, any means of traits, responses, growth conditions will reflect this skewed base of knowledge, not permitting hypothesis testing and generalization. I wrote this book in an attempt to overcome some of these biases and to advance the biological understanding of the patterns observed, beyond the northern hemisphere temperate zone perspective. Yet, readers will notice that this became difficult at times when no data other than cool temperate treeline data were available.

This attempt at a synthesis of treeline biology is rooted in Chap. 7 of *Alpine Plant Life* (Springer 1999/2003), written in the late 1990s. I found it extremely difficult at that time to offer a functional explanation for the lower limit of the alpine life zone, the treeline. A lot of new research has surfaced since I started writing this book, more intensively, over the last 6 years.
Whoever engaged in such a long winding task will understand the
difficulties of keeping all chapters up to date with references. I guess I failed
at places. My deadline for including references by other authors was 1 May
2011. However, this book was not meant to be an exhaustive review. This
rather is a book of ideas, supported by examples, some of which are timeless.
This project materialized only because I received immense help from lots
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Chaps. 4 and Chap. 5 are largely built on these data. Günter Hoch was my
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