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Nota di contenuto	Title Page; Contents; Part III: Recapitulation; Foreword; Preface; Acknowledgments; Part I: Overview; Chapter 1: Introduction; Historical summary; Modeling philosophy; Bioclimatic basis for local community structure; Range; Richness; Major simplifications; Principal assumptions; Principal findings; Part II: Local Species Range and Richness; Chapter 2: Local Climate: Observations and Assessments; Major biomes of North America; Growing season; Solar radiation; Zonal homogeneity; Looking ahead; Chapter 3: Mean Latitudinal Range of Local Species: Prediction; Introduction and definitions Range of local mean species as determined by local distributions about the mean Theoretical estimation of the range with climatic forcing by SW flux only; Range of local modal species versus mean of local species' ranges; Probability mass of the distribution of observed local species; Analytical summary for climatic forcing by SW flux only; Point-by-point estimation of range versus observation for North America; A thought experiment on the variation of SW flux in an isotropic atmosphere; Range of modal species at maxima and minima of the SW flux Gradient estimation of range versus observation for North America Point-by-point estimation of range versus observation for the

Northern Hemisphere; Gradient estimation of range versus observation for the Northern Hemisphere; Low-latitude smoothing of range by latitudinal averaging of the growing season; Range as a reflection of the bioclimatic dispersion of species; A high-latitude shift in bioclimatic control from light to heat?; Extension of these range forecasts by use of multiple forcing variables; A look ahead; Chapter 4: Richness of Local Species: Prediction Versus Observation
Introduction From continuous to discrete distribution of local species; Local SW flux as a stationary Poisson stochastic process; Distribution of C3 species-supporting radiation intercepted in a growing season; Moments of C3 species-supporting radiation intercepted in a growing season; Moments of the number of C3 species-supporting cloud events in a growing season; From climatic disturbance to C3 species germination; Parameter estimation; Predicted potential richness versus observed richness; The theoretical tie between range and richness; Chapter 5: Summary and Conclusions; Precis
Mathematical approximations in range calculation Evaluation of range prediction; Evaluation of richness prediction; Finis; Part IV: Appendices: Reductionist Darwinian Modeling of the Bioclimatic Function for C3 Plant Species; Appendix A: The Individual C3 Leaf; Photosynthetic capacity of the C3 leaf; Mass transfer from free atmosphere to chloroplasts; Assimilation modulation by leaf temperature and ambient CO2 concentration; Exponential approximation to the C3 photosynthetic capacity curve; Potential assimilation efficiency of C3 leaves; The state of stress
Darwinian operating state of the individual C3 leaf

Sommario/riassunto

Published by the American Geophysical Union as part of the Special Publications Series. This is a research monograph and not a textbook. Here I demonstrate analytically how the observed, opposing, latitudinal gradients in the average range and richness of local vascular land plant species are (outside the moist-tropical zone, at least) driven primarily by the local temporal and spatial variability of shortwave radiative flux at the canopy top. (The term "richness" as used here means the local number of different vascular land plant species unlimited by the size of the area sa
