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Chapter 11. Messages from the Earth Crust Introduction; Physical Models of Rupture; Tilt and Strain Observations; Discrete Structure of the Crust; Chapter 12. Fluids Talk; Hydrodynamic Anomalies; Chemistry of Groundwater; Chapter 13. Whispering Gases; Introduction; Radon Gas Concentration as a Precursor; Carbon Dioxide Gas Migration as a Precursor; Changes in Concentrations of Light Gases; Case Histories of Gas Migration Problems; Variations in Concentrations of Gases (Soil Air and Groundwater) Near Faults and Fractured Zones; Changes in the Performance of Oil Fields Hydrocarbon Seepage in the Marine Environment Primary Causes of Geochemical Anomalies; Chapter 14. Progress in Developing a Forecasting System, Preferential Precursors and Monitoring Network; Decision Making in Earthquake Prediction; Selection of Short-term Precursors; Development of a Monitoring Network; Identifying Distinct Patterns; Conclusions; Part III: Principles of Gas Migration; Chapter 15. Gas Migration; Introduction; Sources of Migrating Gases; Chapter 16. Typical Composition of Natural Gases; Introduction; Density of Natural Gases; Chapter 17. Mechanisms of Gas Migration Introduction Types of Gas Migration; Intergranular Flow: Gas Globules Larger than Pore Throat Diameters; Chapter 18. Paths of Gas Migration; Introduction; Pressure Determination; Chapter 19. Hazards Resulting from Migrating Gas; Introduction; Case Studies of Gas Migration; Chapter 20. Hazards of Gas Storage Fields; Introduction; Recommendations for Gas Storage; Part IV: Interrelationships Among Subsidence, Gas Migration, and Seismic Activity; Chapter 21. Interrelationships Among Subsidence, Gas Migration, and Seismic Activity; Introduction; Subsidence Due to Fluid Withdrawal; Compaction Subsidence Bowl

Sommario/riassunto

This breakthrough new book may help save countless lives and avoid enormous losses. It presents a methodology for using gas migration to predict earthquakes and explosive gas buildup. Using rigorous scientific investigation and documented worldwide case histories, this remarkable book presents compelling evidence showing that changes in gas rates, composition, and migration accompany the tectonic events preceding earthquakes and their associated seismic events, such as volcanoes and tsunamis. Because these gas parameters are detectable and measurable, they provide an early warning of seism
