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Concluding remarks; References; TWO: Population of impactors and the impact cratering rate in the inner Solar System; 2.1 Introduction; 2.2 Population of impactors in the inner Solar System; 2.3 Impact frequency of NEOs with the Earth; 2.4 Comparison with the impact record on terrestrial planets; 2.4.1 The Earth; 2.4.2 The other terrestrial planets; 2.5 Variability of the impact frequency during the last 3 Ga; 2.6 The early cratering history of the Solar System; 2.7 Conclusions; References; THREE: The contact and compression stage of impact cratering; 3.1 Introduction; 3.2 Maximum pressures during contact and compression; 3.2.1 The planar impact approximation; 3.2.2 Energy partition during compression; 3.2.3 Unloading of the projectile; 3.3 Jetting during contact and compression; 3.4 The isobaric core; 3.5 Oblique impact; 3.6 The end of contact and compression; References; FOUR: Excavation and impact ejecta emplacement; 4.1 Introduction; 4.2 Excavation; 4.3 Impact plume; 4.4 Generation of continuous ejecta blankets; 4.5 Rayed craters; 4.6 Generation of multiple ejecta layers; 4.6.1 Observations; 4.6.2 Initial impact melt production and early emplacement; 4.6.3 Late-stage melt emplacement - the surface melt flow phase; 4.7 Distal impact ejecta; 4.8 Depth of excavation; References; FIVE: The modification stage of crater formation; 5.1 Introduction; 5.2 Morphology and morphometry of simple and complex impact craters; 5.2.1 Simple crater morphology; 5.2.2 Complex crater morphology; 5.2.3 Crater morphology as a function of size; 5.3 Kinematics of crater collapse; 5.3.1 Kinematics of simple crater formation; 5.3.2 Kinematics of complex crater formation; 5.4 Subsurface structure of complex impact craters; 5.4.1 Crater rim; 5.4.2 Ring syncline; 5.4.3 Central uplift; 5.4.4 Peak ring; 5.5 Mechanics of cavity collapse: what makes the target so weak?; 5.5.1 Target disintegration into blocks; 5.5.2 Distributed and localized brittle deformation; 5.5.3 Localized melting; 5.5.4 Temporary weakening; 5.6 Effects of oblique impact incidences on cavity collapse; 5.7 Effects of rheologically complex targets on cavity modification; References

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## Sommario/riassunto

Impact cratering is arguably the most ubiquitous geological process in the Solar System. It has played an important role in Earth's history, shaping the geological landscape, affecting the evolution of life, and generating economic resources. However, it was only in the latter half of the 20th century that the importance of impact cratering as a geological process was recognized and only during the past couple of decades that the study of meteorite impact structures has moved into the mainstream. This book seeks to fill a critical gap in the literature by providing an overview text covering

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