Contents

Chapter 1  1-34  
Introduction and Literature Survey

1.1 The Sun  
1.1.1 Solar Interior  2  
1.1.2 The Solar Atmosphere  4  
1.2 Solar Wind, Interplanetary Magnetic Field, and the Heliosphere  5  
1.3 Large-Scale Structures in the Heliosphere  11  
1.3.1 Coronal Mass Ejections and Their propagation in the Interplanetary Medium  11  
1.3.2 Interplanetary Shocks  14  
1.3.3 Shock associated ICMEs  17  
1.3.4 Magnetic Cloud  19  
1.3.5 Corotating Interaction Regions (CIRs)  20  
1.4 Solar Modulation of Cosmic Rays: Basic Concepts  22  
1.5 Forbush Decreases and Corotating Decreases  28  
1.6 Objectives and Scope of the Present Work  32

Chapter 2  35-68  
Transient Modulation of Cosmic-Ray Intensity associated with Interplanetary Coronal Mass Ejections and its Various Features

2.1 Introduction  36  
2.2 Data Analysis  38  
2.2.1 Method of Superposed-Epoch Analysis  39  
2.2.2 Correlation Analysis  40  
2.3 Results and Discussion  40  
2.3.1 Average Plasma/Field Properties during Passage of ICMEs of Different GCR Effectiveness: Superposed-Epoch Analysis  40  
2.3.2 Distribution of Plasma/Field Parameters for ICMEs with Different GCR Effectiveness  45  
2.3.3 GCR Effectiveness of ICMEs associated with Different Structures/Features: Superposed-Epoch Analysis  45  
2.3.4 GCR Effectiveness of ICMEs with Different Structures/Features: Statistical Results  57  
2.3.5 Decrease Amplitude and Its Dependence on Interplanetary Parameters: Quantitative Relationship  61