
Contents

CHAPTER 1. INTRODUCTION	1
1.1. Context	1
1.2. Identification	3
1.3. Expectations and results	5
1.4. Contents of the work	6
CHAPTER 2. CLIMATIC DATA	11
2.1. Sources	11
2.2. Global temperature	12
2.2.1. Modern temperatures.	12
2.2.2. Pre-industrial temperature.	13
2.2.3. Paleotemperatures	14
2.3. Concentration of CO ₂ in the atmosphere.	17
2.4. Solar activity	18
2.5. Volcanic activity.	26
CHAPTER 3. THE WAR OF THE GRAPHS	29
3.1. History.	29
3.2. Inconsistent controversies	35
3.3. Usable data	38
CHAPTER 4. FORMULATING AN ENERGY BALANCE MODEL.	41
4.1. State models and transmittance	41
4.2. Structure of an energy balance model	44
4.3. Specificity of EBMs.	47
4.4. Dynamic parametrization.	49

CHAPTER 5. PRESUMED PARAMETERS	55
5.1. Terminology	55
5.2. Climate sensitivity S_{clim}	57
5.3. Coefficient of radiative forcing α_1	58
5.4. The climate feedback coefficient λ_G	58
5.5. Sensitivity to irradiance S_2	59
5.6. Sensitivity to volcanic activity S_3	61
5.7. Climate or anthropogenic sensitivity	61
5.8. Review of uncertainties	63
CHAPTER 6. IDENTIFICATION METHOD	67
6.1. The current state of affairs	67
6.2. Output error method	69
6.3. Estimating the error variance	70
6.4. Hypothesis test and confidence regions	72
6.5. Conditions of application	73
CHAPTER 7. PARTIAL RESULTS	75
7.1. A selection of data	75
7.2. Free identification	77
7.3. Forced identifications	81
7.4. Statistical analysis	86
CHAPTER 8. OVERALL RESULTS	91
8.1. Preliminary comments	91
8.2. Regions and intervals of confidence	93
8.3. Hypothesis test	96
8.4. Comments	97
CHAPTER 9. HISTORIC MINUSCULE SIMULATIONS	99
9.1. Overview of IPCC simulations	99
9.2. Comparative simulations	100
9.3. Representative concentration pathways (RCPs)	102
9.4. Comparative radiative forcing	105
CHAPTER 10. LONG-TERM CLIMATE PROJECTIONS	107
10.1. IPCC scenarios and projections	107
10.2. EBM compatible scenarios	109
10.3. Long-term projections	110
10.4. A disaster scenario	113

CHAPTER 11. SHORT-TERM PREDICTIONS.	115
11.1. Decadal time scale predictions by GCM	115
11.2. The climate's natural variability	117
11.3. State estimate and prediction.	120
11.4. Decadal time scale predictions by EBM	123
11.5. <i>A posteriori</i> predictions	124
CHAPTER 12. CONCLUSIONS	129
12.1. On the identification	129
12.2. Climate sensitivity	130
12.3. Solar activity	131
12.4. Predictive capacity	132
12.5. The climate change in question	133
12.6. Prospects.	133
BIBLIOGRAPHY	135
INDEX	141