

---

## Contents

---

<b>Preface</b> . . . . .	xi
Céline LUTOFF and Séverine DURAND	
<b>Chapter 1. Interdisciplinary Travel</b> . . . . .	1
Céline LUTOFF, Jean-Dominique CREUTIN, Séverine DURAND, Isabelle RUIN, Sandrine ANQUETIN and Brice BOUDEVILLAIN	
1.1. Introduction . . . . .	1
1.2. Why this interdisciplinary journey? . . . . .	2
1.3. Barriers to interdisciplinary and other “travel” difficulties . . . . .	5
1.4. Beginning the journey . . . . .	9
1.4.1. Choosing a destination . . . . .	10
1.4.2. The interdisciplinary traveler . . . . .	11
1.4.3. The traveler’s backpack in interdisciplinarity . . . . .	12
1.4.4. The toolbox . . . . .	12
1.4.5. Impregnation. . . . .	14
1.4.6. Transposition . . . . .	15
1.5. Conclusion: a trip to prepare yourself for! . . . . .	20
1.6. References. . . . .	21
<b>Chapter 2. The Pace of Urbanization in Flood-Prone Areas</b> . . . . .	27
Sylvie DUVILLARD, Isabelle ANDRÉ-POYAUD and Charles-Antoine CHOQUET	
2.1. Introduction . . . . .	27
2.2. The pace of urbanization and flooding: a difficult correlation to be established. . . . .	28
2.2.1. Flooding, urbanization and real estate markets: complex interactions . . . . .	28

2.2.2. The data mobilized: the number of constructions recorded in tax files . . . . .	30
2.2.3. Mobilizing PPRI zoning to assign a floodplain and a risk level to a plot and a premises. . . . .	35
2.3. Urbanization rates in flood-prone areas in the Gard department. . . . .	38
2.3.1. Strong inter-annual fluctuations and a significant reduction in urbanization in floodplains from 1995 onward . . . . .	38
2.3.2. Discrepancies in paces according to building types . . . . .	43
2.4. Premises, contrasting situations . . . . .	46
2.4.1. Typology of the municipalities of the Gard according to exposure to flood risk: summary in 2012 . . . . .	47
2.4.2. Time agreement between recurrence of events and reduction of individual housing in flood-prone areas: the example of Nîmes . . . . .	55
2.5. Conclusion . . . . .	59
2.6. References. . . . .	59
<b>Chapter 3. Factors Influencing Residential Choices in Flood-Prone Areas: From Principles to Actors' Actual Practices</b> . . . . .	63
Séverine DURAND, Céline LUTOFF and Sylvie DUVILLARD	
3.1. Introduction . . . . .	63
3.2. Socio-ethnographic investigation on living practices and narratives by land professionals . . . . .	65
3.2.1. Methodology. . . . .	65
3.2.2. Areas of study . . . . .	67
3.3. The buyer's informed choice: no uninformed buyers . . . . .	69
3.3.1. The marginal influence of flooding on residential trajectories in exposed municipalities . . . . .	75
3.3.2. A flood that does not affect prices? . . . . .	78
3.4. Discussion. . . . .	83
3.5. Conclusion . . . . .	84
3.6. Reference . . . . .	86
<b>Chapter 4. When Driving to Work Becomes Dangerous</b> . . . . .	91
Isabelle RUIN, Saif SHABOU, Sonia CHARDONNEL, Céline LUTOFF and Sandrine ANQUETIN	
4.1. Introduction . . . . .	91
4.2. Spatial and temporal dynamics of road network exposure to flash floods . . . . .	93

4.2.1. Sensitivity of the Gard road network to high water levels. . . . .	93
4.2.2. Precipitation dynamics and flooding probabilities . . . . .	96
4.3. Spatio-temporal dynamics of daily mobility . . . . .	98
4.3.1. Daily mobility behaviors in Languedoc-Roussillon . . . . .	100
4.3.2. The daily mobility pattern of workers in Gard. . . . .	103
4.3.3. Adaptation of mobility behavior in the face of risk. . . . .	104
4.4. Simulation of the dynamics of human exposure to flash floods . . . . .	106
4.4.1. Simulation method . . . . .	107
4.4.2. Results on the case study of the flooding of September 8–9, 2002 in the Alès (Gard) sector . . . . .	111
4.5. Conclusion and perspectives . . . . .	114
4.6. References. . . . .	116
<b>Chapter 5. Assigning Travel-Activity Patterns Based On Socio-Demographics for Flood Risk Assessment . . . . .</b>	<b>119</b>
Saif SHABOU, Isabelle RUIN, Céline LUTOFF, Sonia CHARDONNEL and Samuel DEBIONNE	
5.1. Introduction . . . . .	119
5.2. Travel-activity behaviors . . . . .	121
5.2.1. Travel demand models . . . . .	122
5.2.2. The advantages of using sequences analysis methods . . . . .	124
5.3. Data and methods . . . . .	126
5.3.1. Data . . . . .	126
5.3.2. Activity sequences comparison . . . . .	127
5.3.3. Discrepancy analysis. . . . .	129
5.3.4. Schedule assignment model evaluation . . . . .	130
5.4. Results . . . . .	131
5.4.1. Descriptive statistics . . . . .	131
5.4.2. Schedule analysis. . . . .	134
5.5. Conclusion and discussion . . . . .	141
5.6. References. . . . .	144
<b>Chapter 6. Geolocated Tweets as a Means of Observing Extreme Natural Events. First Specifications. . . . .</b>	<b>149</b>
Camille CAVALIÈRE, Paule-Annick DAVOINE, Céline LUTOFF and Isabelle RUIN	
6.1. Introduction . . . . .	149
6.2. Geolocated tweets: a geographical opportunity or form of risk-taking? . . . . .	151

6.2.1. How have geolocation devices changed the individual's place in real-time risk management? . . . . .	151
6.2.2. Useful information or Big Garbage? . . . . .	153
6.3. Properties of geolocated tweets . . . . .	154
6.3.1. Who tweets when activating geolocation and why? . . . . .	154
6.3.2. Digital footprints with heterogeneous forms . . . . .	155
6.3.3. Quantities of tweeted digital footprints . . . . .	157
6.4. Construction of a set of crisis tweets and mobilized data . . . . .	159
6.4.1. Methodology applied . . . . .	159
6.4.2. Introduction of additional data: dates and severity of events . . . . .	163
6.5. First explorations and analyses of data sets . . . . .	163
6.5.1. Characteristics of the geolocated crisis tweets sets . . . . .	164
6.5.2. Spatio-temporal and semantic analysis by abduction . . . . .	167
6.6. Conclusion . . . . .	172
6.7. References. . . . .	173
<b>Chapter 7. Adaptation Paces – Physical Cursors for Action Analysis.</b> . . . . .	177
Céline LUTOFF, Brice BOUDEVILLAIN, Jean-Dominique CREUTIN and Sonia CHARDONNEL	
7.1. Introduction . . . . .	177
7.2. Why are physical cursors needed to study adaptation during a crisis? . . . . .	178
7.2.1. Flooding is a “villainous risk” . . . . .	178
7.2.2. The multiple appearances of a flash flood . . . . .	179
7.2.3. Physical cursors for action analysis . . . . .	180
7.3. Flood peak as the origin of time to analyze adaptation . . . . .	181
7.3.1. Flood peaks and peak danger . . . . .	181
7.3.2. Multiple danger peaks in the same disaster. . . . .	184
7.3.3. Changing the origin of time: a common adaptation issue . . . . .	185
7.3.4. Determining peak time requires modeling . . . . .	186
7.4. The rhythm of rising water as a pace for analyzing the crisis . . . . .	186
7.4.1. The pace of the thunderstorm and the river at a given point . . . . .	186
7.4.2. Pre-cursors (post-cursors) and risk perception. . . . .	188
7.4.3. The multiple paces of thunderstorms and floods in the same disaster. . . . .	190
7.4.4. Adopting the right pace: a common adaptation issue . . . . .	192
7.4.5. Determining the characteristic pace of a place by the size of the upstream basin . . . . .	192

7.5. The pace of water level recession as a post-crisis tempo . . . . .	193
7.5.1. A “rapid” recession in water levels... then a more “classic” rhythm . . . . .	193
7.5.2. The special case of “repeated” thunderstorm events . . . . .	195
7.6. The rate of occurrence of floods as a tempo for analyzing the inter-crisis period . . . . .	197
7.6.1. The probability of complex events within a territory. . . . .	197
7.6.2. The pace of major atmospheric forcings and seasonal forecasting . . . . .	199
7.7. To conclude: interpreting the cursors . . . . .	200
7.8. References. . . . .	201
<b>Chapter 8. Method for Observing the Rates of Exposure to Flash Floods: Physical and Social Processes . . . . .</b>	<b>205</b>
Céline LUTOFF, Séverine DURAND and Jean-Dominique CREUTIN	
8.1. Introduction . . . . .	205
8.2. Comparison of phenomena and data . . . . .	206
8.2.1. Reconstructing daily traffic on the Gard’s roads . . . . .	207
8.2.2. Describing the floodability of the road . . . . .	208
8.2.3. Explore the effect of individual decisions on population exposure . . . . .	209
8.2.4. Extreme events, impact and regulatory developments . . . . .	210
8.2.5. Regional residential mobility and its link to flooding . . . . .	211
8.3. The main classes of data: their contributions and limitations . . . . .	212
8.3.1. Sampling in time and space – resolution and field of observation . . . . .	212
8.3.2. Nature and level of integration of observations . . . . .	214
8.3.3. Usefulness of reading by classes of data shared between being physical and human . . . . .	216
8.4. Hierarchy of phenomena and mobilization of scales . . . . .	217
8.4.1. A first level of decomposition in temporality and mobility . . . . .	218
8.4.2. The convening of a broader set of dimensions. . . . .	219
8.4.3. Projection in time and space . . . . .	220
8.5. Reflection on the method as a conclusion . . . . .	221
8.6. References. . . . .	224
<b>Conclusion . . . . .</b>	<b>227</b>
Séverine DURAND and Céline LUTOFF	

<b>Appendix 1</b> .....	233
<b>Appendix 2</b> .....	239
<b>List of Authors</b> .....	247
<b>Index</b> .....	249