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3 **Preparedness actions towards seismic risk mitigation for the general public in Martinique,**
4 **French Lesser Antilles: a mid-term appraisal**

5

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10

11 **Abstract**

12 Martinique is a French island in the Lesser Antilles, with a high seismic hazard. In 2006, Martinican
13 stakeholders involved in seismic safety formed the “Réplik” working group (“Aftershock” in
14 French), the first of its kind in this region. This paper addresses a mid-term appraisal of the first
15 seismic awareness campaign organized by Réplik from 2006 to 2011, and how it has modified, or
16 not, local earthquake and tsunami preparedness. Despite efforts from Réplik to assess its efficiency
17 through surveys, a growing gap is noted between the observed awareness and the actual preparedness
18 of the public. As usual, gender, age, educational level, then boredom and saturation contribute to this
19 discrepancy; strong cultural items may also influence the perception of actions. To remain efficient
20 and respond to public’s expectations, Réplik must redirect its actions towards a cultural congruence
21 of information: consideration of religion and local beliefs, comprehensive messages on TV and radio,
22 use of Creole language, participatory experiences and drills, with a little bit of science. So that, the
23 Réplik stakeholders can hope to increase Martinicans’ involvement into the preparedness process, to
24 cope quickly with a strong earthquake and this know-how can be shared with other seismically active
25 islands in the Caribbean.

26

27 Key words: seismic; preparedness; public; campaign; Antilles; Martinique; French Earthquake Plan

28

29 **1 Introduction**

30 Martinique Island is a French Overseas island of the Lesser Antilles archipelago, in the eastern
31 Caribbean Sea. Martinique is located at a plate boundary (Fig. 1), above the North American plate
32 subduction beneath the Caribbean plate at 2cm/yr. (Lopez et al., 2006); it was formed over 25 million
33 years by the joining together of several volcano complexes (Westercamp et al., 1989; Germa et al.,
34 2011). This geodynamic position on top of a descending slab implies a high seismic hazard (Fig. 1):
35 around 1 000 events are detected each year, located at the subduction interface, within the Atlantic
36 slab and the deforming Caribbean plate (Beauducel et al., 2011) but only a very few of these events
37 are felt. The French SisFrance catalogue of historical earthquakes (BRGM, 2009) illustrates several
38 strong MSK intensity events that have hit the island in the past: 1727 (VIII), 1827 (VII), 1839 (IX),
39 1946 (VII-VIII), 1999 (Mb 5.5, VII) and the recent 2007 earthquake (Mw 7.4 and EMS98 int.VI-VII,
40 see Fig. 2). Historical tsunamis are also reputed to have submerged the Atlantic coastline of
41 Martinique (BRGM, 2010). These submersions had several origins (O'Loughlin and Lander, 2003;
42 Lambert and Terrier, 2011): the 1755 Lisbon earthquake, the 1767 Barbados earthquake, the 1867
43 Virgin Islands earthquake and the 1902 Mount Pelée volcanic eruption. There is still a high concern
44 in Martinique within public services regarding an eventual close, strong earthquake rupturing the
45 oceanic floor at the subduction front 250 km off the eastern coast of Martinique.

46 Mainland Martinique includes a 1128-km² mountainous island (Fig. 2). The highest point is Mount
47 Pelée standing at 1397 m, a large explosive volcano which last erupted in 1929 and previously in
48 1902, destroying the then main city of Saint-Pierre. The current population of Martinique is around
49 403,000 inhabitants (INSEE, 2011), with one fourth living in or around Fort-de-France, the rest
50 mostly in coastal towns (Fig. 2).

51 In 2005, France reviews its national seismic zonation. The highest peak ground acceleration of the
52 territory is attributed to Martinique and Guadeloupe (PGA over 0,3g for a 475 yr.-return period). In
53 2007, the National Earthquake Plan is launched; it includes the Antilles Earthquake Plan, to dedicate
54 specific actions to Martinique and Guadeloupe, owing to their high hazard level and island
55 specificity. The objective was to reduce the vulnerability of people and buildings in the French West
56 Indies.

57 The objective of this paper is to present a mid-term appraisal of this recent and short seismic
58 educational campaign in Martinique. A number of original actions were carried out for the first time
59 from 2006 to 2011, and annual surveys were used to check the assimilation of actions and how these
60 modified, or not, the preparedness of the general public (Audru et al., 2011b). Successes and failures

61 were thus pointed out. Despite a lack of robust feedback, some hypotheses are made in this paper that
62 may explain the observed lack of involvement into prevention actions and of preparedness. Several
63 suggestions will be put forward to improve the preparedness process, which is essential, so that
64 Martinique is able to cope quickly with a strong earthquake.

65

66 **2 The preparedness campaign**

67 Within the national plans framework, services or associations involved in seismic safety in
68 Martinique came together in 2006 into a working group called “Réplik” (“Réplik” means
69 “Aftershock” in French), the first of its kind and importance in this region. A logo was created which
70 is still in use (Fig. 3). Since then, all major actions regarding public information and preparedness are
71 implemented and validated by Réplik, which includes state representatives, the Directorate for
72 Environment Planning and Housing, the Association of Mayors, the Regional and General Councils,
73 the French Geological Survey, the Civil Defence, the French Army, the Academy, the Seismological
74 and Volcanological Observatory, the Architects Council, the Regional Health Agency, the
75 Departmental Agency for Housing Information, the Departmental Fire and Rescue Service and
76 several private consultants specialized in media, communication and social psychology. This
77 diversity allows a wide array of sensibilities and ideas and favours the diffusion of messages agreed
78 on by all partners.

79 Réplik’s actions relating to earthquake and tsunami preparedness are characterised by events and
80 innovations, taking place all year long but particularly in November (end of cyclonic season). These
81 actions target residents (adults, pupils, employees, construction professionals etc.) and non-residents
82 (Audru, 2010).

83 Actions in public areas include travelling theatre skits (how to talk about seismic preparedness with
84 humour in various situations of contemporary life, in Creole and French), a prevention caravan and
85 the earthquake simulator of the General Council (which allows people to learn about earthquakes’
86 origins and to experience shaking), scientific conferences about the effects and consequences of
87 earthquakes and tsunamis, art exhibitions related to earthquakes, information stands in annual
88 housing fairs or hardware stores, and participation in Carnival parades. The “Réplik for Companies”
89 action is specifically dedicated to employees and is very successful. It consists in information which
90 is given to employees in their workplace during working hours, which is of major importance.
91 Seismic preparedness presentations are given at the request of companies, and are adapted to

92 workplaces and workmates with leaflets tailored specifically to companies' working practices then
93 being distributed.

94 Actions also take place in schools. Booklets are adapted to pupils, preparedness and evacuation plans
95 are carried out by teachers and pupils under the authority of the Local Education Authority. In five
96 high schools, an original project ("seismometer at school") installed seismometers for educational
97 purposes (www.edusismo.org). The seismometers monitor the local and worldwide seismicity;
98 recordings are operated by pupils and transmitted for computing to seismologists. The signals,
99 downloadable for all, are then used by pupils within the framework of their curriculum.

100 Various goodies are distributed to remind people how to behave in the event of an earthquake or
101 evacuate if a tsunami occurs: tee-shirts, caps, whistles, magnets, posters and brochures drawn by
102 children, mouse pads, etc. Leaflets with instructions for safety during an earthquake have been sent
103 by post to all families in Martinique with electricity bills. Local TV channels, cinema or radio
104 stations are also involved in the campaign; they broadcast short spots, reality shows and cartoons of
105 families facing earthquake situations.

106 Tourists arriving to Martinique are informed through short notes regarding dos and don'ts during
107 earthquakes and tsunamis, printed on free roadmaps which are offered by hotels, tourism information
108 desks and rental cars.

109 With time, the Réplik leaflets and messages gradually benefit from a wider partnership and
110 dissemination network, usually for free: buses, pharmacies, medical offices, insurance firms, post
111 offices, petrol outlets, commercial centres, tourism offices etc. (Audru et al., 2011a). Examples of
112 printed materials and media are shown in Fig. 3. Eventually, all advice, videos, leaflets, dos and
113 don'ts related to seismic and tsunami safety from Réplik are compiled on a Martinique-specific
114 website (www.replik972.fr). From August 2011 to July 2012, the site recorded 262,000 short hits and
115 around 22,500 thirty-minute visits, which is actually not a high result.

116 On the neighbouring French Island of Guadeloupe, a website dedicated to the self-evaluation of
117 house seismic vulnerability (Bengoubou-Valérius, 2009) is created in 2011
118 (www.miseismantilles.com). The analysis of web traffic shows that Martinicans represent one third
119 of visitors; among these, up to 40% of Martinique evaluated houses prove vulnerable to earthquakes
120 (Bengoubou-Valerius, pers. Comm.). This confirms that in Martinique, many private buildings do not
121 meet the mandatory seismic building rules in force since 1996 (French PS-92 codes), despite strong
122 site effects have been evidenced since 1995 by microzonations (Gagnepain-Beyneix, 1995;
123 Chassagneux et al., 1996 among others). This is why Réplik has also funded technical sheets and

124 simplified building codes dedicated to traditional small-scale builders. As a complement, specific
125 training courses are dedicated to masons regarding paraseismic building practices, based on recent
126 and neighbours experiences (Spence, 2007; Adams, 2009). However, despite their high interest, the
127 courses do not appeal to lots of self-employed masons (100 a year), probably due to the perceived
128 loss of time involved in attending. For public buildings, done and current seismic diagnoses underline
129 a high level of vulnerability and a large number of retrofit and reconstruction programs have been
130 implemented.

131 From a scientific point of view, the Antilles Earthquake Plan encourages applied scientific studies.
132 The regional evaluation of tsunami hazards is completed for the Caribbean French islands, using
133 simulations based on the compilation historical scenarios (Pedreros and Terrier, 2007). Precise
134 tsunami submersion maps are in project, to help municipalities to organize their evacuation plan.
135 Seismic microzonations are already in progress in several districts of Martinique following a
136 homogeneous methodology (Monge et al., 2000; Vanoudheusden et al., 2011), as well as a predictive
137 earthquake-induced damage evaluation for the whole island (Belvaux et al., 2013). In 2009, the
138 SeisMCaRe® (Seismic Mitigation in the Caribbean Region) symposium (www.seismcare.com)
139 gathered together twenty Caribbean countries in order to share know-hows, successes and failures in
140 mitigation and education experiences between Caribbean neighbours.

141 Alarming results obtained from initial simulations of strong earthquake consequences (Monge et al.,
142 2000) encouraged the authorities to organize, within the AEP framework, a wide simulation drill in
143 2008 which took place simultaneously in Martinique and Guadeloupe. The “Richter Antilles” drill
144 lasted 24 hours and tested several topics (Cova, 2009) such as the coordination of rescue services,
145 management dysfunctions (population, lifelines, and casualties), national reinforcements, and
146 deceased people management. The drill marked a turning point for such simulation exercises in
147 France (Winter et al., 2009).

148 Despite this wide array of preparedness actions from 2006 to 2011, a question rapidly arises: what is
149 the actual impact and effectiveness of this educational campaign among the population? The question
150 is important, almost vital, given the historical records and the high seismic and tsunami hazard
151 threatening Martinique.

152

153 **3 The public’s general perception of preparedness actions**

154 Methodology

155 The perception of preparedness actions by the public does not benefit from a strong history and
156 feedback. It is approached through the analysis of five short surveys conducted in Martinique in
157 various conditions in 1999, then from 2006 to 2010 (Fig. 4). The 1999 survey was conducted by the
158 University of the French West Indies after the 1999 earthquake; the last four were organized by a
159 specialized polling company under Réplik request. The surveys structures remained quite simple;
160 detailed information about the data collection process, questionnaires and analysis is available from
161 the author on request.

162 Results

163 The 1999 survey occurred within ten days following the 5.5 earthquake. The authors (Léone and
164 Mavoungou, 2000) telephoned 224 people who were standing in buildings during the event. The
165 analysis of their answers outlined that 75% of those surveyed described inappropriate behaviour
166 during the event and 64% after the event; later on, only 22% of those surveyed took preparedness
167 measures. The people surveyed had then expressed high expectations in terms of information and
168 preparation advice.

169 In 2006, a second survey was conducted among 334 Martinican visitors to the itinerant earthquake
170 simulator. Colbeau-Justin et al. (2007) had outlined that most of the visitors (72.5%) proved
171 interested in safety measures, especially in terms of technical aspects (49%) rather than scientific
172 aspects; the latter being considered useless for individual protection. Women showed more interest
173 (60%) in the correct behaviour to adopt during an earthquake, in the reliability of the home interior
174 and in the preparation of survival kits, while men (40%) were interested in technical skills
175 (construction, first aid certificates).

176 The survey also evidenced the public's preference for an immediate response organization (as
177 opposed to post-crisis planning) via TV (65%), rather than through written brochures (31.5%), insets
178 in newspapers, scientific conferences or neighbourhood meetings, which was indeed common to
179 several countries (Spence, 2007). On this basis, Colbeau-Justin et al. (2007) suggested that
180 Martinicans preferred personal learning experiences and visual demonstrations, which explains the
181 continuing success of the earthquake simulator and of the itinerant theatre. This use of a few media
182 for addressing prevention actions is also preferred in Turkey for instance (Tekeli-Yeşil et al., 2011).
183 The male-female dichotomy is observed elsewhere (Mulilis, 1999); Solberg et al. (2010), from a
184 detailed lecture of the related psychological literature, suggest that experience, gender and also age
185 can shape risk perception and thus a campaign's successes or failures. The above analysis encouraged

186 Réplik to prepare TV spots and cartoons featuring a woman preparing her family for a potential
187 earthquake.

188 The 2007 survey followed the 7.4 earthquake (which occurred one month before). This poll
189 (computer-assisted telephone interviews) of 1050 Martinicans (Ipsos Antilles, 2008) aged over 15
190 who felt the earthquake, revealed that 63% of people judged themselves sufficiently informed, while
191 68% had heard about Réplik's actions. The analysis showed that 62% knew how to behave during the
192 earthquake and 70% believed they had appropriate behaviour during the event. Indeed, only 20% of
193 people had immediately exited buildings, 21% moved away from building facades, 19% had listened
194 to the radio and 2-3% had cut electricity and gas. On the contrary, 42% of people inside buildings
195 had inadequate responses: 41% used stairs to exit buildings during the shaking, 38% remained inside
196 buildings after the first shock, 39% used a cellular phone and 36% entered back into the buildings
197 shortly after the main shock. More educated people and those younger than 36 were much more
198 aware of the reality of risk (89%) than elderly or less educated people (69%), who were less affected
199 by communication campaigns. The survey showed that appropriate instructions given by Réplik were
200 mostly known, but were rarely enforced. People's knowledge was affected by surprise, fear and even
201 panic for some, preventing them from behaving in an appropriate way (Ipsos Antilles, 2008). Finally,
202 only 3 to 18% of Martinicans, mainly those under the age of 36, spontaneously said they would
203 enhance their preparedness, these values went up to 71% when people were told what sort of action
204 to take (survival kits, home security, seismic drills etc.).

205 In 2009, a fourth survey (Ipsos Antilles, 2009) tested the response to actions developed through
206 Réplik in 2008, in order to assess the impact of the modified campaign. The survey of 503 people
207 living in Martinique (computer-assisted telephone interviews) showed that awareness of Replik
208 increased to 79% of the public, especially among women. This was mainly due to the strong
209 emphasis placed on TV cartoons (seen by 79.9%) and radio spots (heard by 64.6%) with the
210 involvement of local popular personalities (singers, writers, the archbishop etc.) and of the prevention
211 caravan (9%). The perception of dos and don'ts in building codes increased in up to 54% of the
212 public. TV and radio remained the best dissemination channels even if their audience decreased by
213 10% compared to 2007. The toll-free information phone number got very few calls (1%) and was
214 then abandoned. This survey revealed that the 2007 earthquake experience increased preparedness for
215 a while, as observed in other studies (Dooley et al., 1992; Nguyen et al., 2006), but with variable
216 impact, may be depending on 2007 material losses, as observed elsewhere (Lindell and Perry, 2000),

217 or most probably on individuals' unrealistic estimations of their own ability to cope with the
218 consequences of an earthquake (Colbeau-Justin, 2009).

219 The last Réplik survey occurred in 2010 (Ipsos Antilles, 2010). This poll (computer-assisted
220 telephone interviews) of 509 Martinicans outlined a decrease in Réplik awareness to 74% of
221 respondents (Fig. 4). The participation in prevention actions decreased considerably with the
222 exception of the theatre skit (11%), illustrating either a good knowledge of correct behaviours or
223 saturation or even public boredom regarding preparedness actions (Audru et al., 2011a). Respondents
224 found the actions' content less relevant than previous years. The TV (79%) and the radio (49%)
225 remained the best communication vectors, far above printed materials (11%) and internet information
226 channels (3%). This latter information highlights the difference of culture to cope with, in earthquake
227 prevention, with internet being a much more promising dissemination technique for Turk people for
228 instance (Tekeli-Yeşil et al., 2011) than for Martinicans. The observed decrease in people's interest
229 through this survey suggests that inadequate actions and messages were presented at some time
230 during the 2010 Réplik campaign: these factors decrease people's knowledge (Johnston et al., 2005),
231 as does the frequency of the messages, (Mileti and Fitzpatrick, 1992) which can alter risk awareness
232 and contribute to the persistence of inadequate behaviour.

233 A parallel survey conducted through the housing self-evaluation website confirmed that in both
234 Guadeloupe and Martinique, 75% of people know the dos and don'ts regarding earthquake safety;
235 however, only 20% say that they are "earthquake-ready" and 32% have prepared a survival-kit
236 (Bengoubou-Valerius, pers. comm.). These values are close to the 2008 post-earthquake survey and
237 may reflect an inappropriate self-estimation of preparedness.

238

239 **4 Discussion**

240 Martinican respondents to the surveys generally have a high level of knowledge about the possible
241 occurrence of strong earthquakes or tsunamis. As an encouraging result, Réplik's actions have
242 significantly raised an interest and its set points were known by 80% of the public in Martinique in
243 2010. However, the surveys outline a discrepancy between those who are aware and those who
244 actually prove able to cope with earthquake or tsunami consequences. Considerable efforts must still
245 be made to reinforce people's involvement. Which hypotheses can be made to explain the obstacles
246 and what are the perspectives?

247 A first hypothesis is based on daily life in Martinique, which is strongly influenced by fatalism. It is
248 anchored in religion but also in magical beliefs or superstitions which have been inherited from the
249 population's African, European and Amerindian origins (Léti, 2000): "Quimbois", for instance,
250 comprises practices related to magic and sorcery very similar to "Voodoo" in Haiti (Revert, 1951).
251 Indeed, beliefs like "earthquakes occur during the hot season", "talking about earthquakes makes
252 them occur", "the island will sink" and "the island will be cut in half" are still common (Léone and
253 Mavoungou, 2000; Sarant et al., 2004; Colbeau-Justin et al., 2007). Regarding religion, up to 13% of
254 people interviewed for the 2008 survey attribute a divine origin to earthquakes, mainly those over 55
255 years of age and people not having been to high school (Ipsos Antilles, 2008). Magical beliefs and
256 religion, as an important element of the Martinican culture, have not been explored through surveys
257 yet. At this stage, but no one knows to what extent yet, one can make the hypothesis that such
258 popular beliefs and religion decrease the actual perception of the threat by misrepresenting the actual
259 consequences of an earthquake in Martinique, as observed in other regions (Turner et al., 1986). It
260 implies that nothing can be done to protect oneself and it clearly influences individual's involvement;
261 this inhibits or slows down citizens' engagement in preventative practices and preparedness actions
262 (Turner et al., 1986; Paton et al., 2005). This is probably the reason why, in survey answers, the
263 possible consequences of earthquakes are never clearly described by people and therefore are not
264 clearly anticipated and, even less, prepared for. These cultural and religious considerations have to be
265 much more included in the next Réplik phase, in order to increase the effectiveness of prevention
266 (Chester 2005; Chester et al., 2008). Solberg et al. (2010) argue that the preparedness sources of
267 information have to be strongly culturally congruent with the general public in order to be fully
268 trusted and accepted. A role may be given to the clergy (Chester, 1985) to help overcome the
269 perception of the divine and inevitable consequences of earthquakes and tsunamis. The inclusion of
270 much more local culture into the preventative actions of an efficient preparedness plan is also
271 supported by Tanaka (2005) or either the United Nations (2005).

272 Another hypothesis is that messages are not correctly formatted. Martinican and Turkish surveys for
273 instance (Tekeli-Yeşil et al., 2011) highlight similar knowledge and preparedness attitudes according
274 to socioeconomic factors and educational level. Tekeli-Yeşil et al. (2011) or Barooah (2006) in India
275 both favour preparedness programmes carried out by the media to target weaker people characterized
276 by lower educational and socio-economic levels. Nathe et al. (1999), then Olshansky (2005), give
277 simple guides to reaching these ambitious objectives as part of an efficient long haul campaign: clear
278 messages using common, comprehensive words, tailored for specific audiences, sent through modern
279 media and a wide partnership network. An unusual approach is given by Paton et al. (2005) who

280 define three successive stages of preparedness: motivation to prepare, formation of intentions, and the
281 conversion of intentions into actions. People progress to the next phase under relatively high (but
282 appropriate, see Lamontagne and La Rochelle, 2000) levels of hazard anxiety. Specific strategies
283 form a step from one stage to another, for example information targeted to a specific community, as
284 cited by Tekeli-Yesil et al. (2011) above. Weiss et al. (2011) promote the perspective of a more
285 participatory communication for the prevention of natural hazards.

286 A third hypothesis states that science is not in a good position in the campaign. People show very
287 little interest in science because it does not help them in practical prevention actions (rescue kits,
288 furniture etc.). Despite the low levels of audience interest, science may still have a role to play.
289 According to Lamontagne and La Rochelle (2000), seismologists should follow psychological
290 courses to help and support the public's emotional reactions before or after an earthquake. Scientists
291 should also participate in communication plans which include concrete facts about earthquakes, to
292 anticipate the event and its associated anxiety (Lamontagne, 1992, McClure et al., 1999). Science can
293 at least promote up-to-date scientific ideas instead of fakes and rumours disseminated by local beliefs
294 or the internet.

295 These hypotheses regarding local and cultural factors may explain the failures in Réplik's campaign.
296 Our set of observations, despite it is quite short in time and despite the surveys are simple, favours
297 new prevention axes for Martinique. The second phase of the Antilles Earthquake Plan will begin in
298 2013 and will offer the opportunity to test these hypotheses and to redirect Réplik's actions.

299 First, a survey would specifically explore the weight of beliefs and religion in the representations of
300 earthquakes and tsunamis in Martinique. This will allow a tailored response to Martinicans' demands
301 and needs, in accordance with most recent UN advice (United Nations, 2005). The use of much more
302 Creole language in media and messages could help overcoming the cultural beliefs, the barrier of
303 fatalism and the disinterest in basic science. Such a redirection may help people to take an extra step
304 towards the preparedness process of Paton and overcome their subjective representations.

305 Then emphasis should be put on the answer to growing demand for practical skills: individual short
306 training courses for adults and pupils (first aid courses, appropriate behaviour at home, outside, at
307 work, at the seaside etc.), home security (furniture organisation and securing, rescue kits for homes,
308 work and cars etc.). TV and radio will be the privileged vectors.

309 In Martinique, the community network is very dense, due to the small space formed by the island and
310 to the numerous interconnections between families. This community strength should be used to
311 increase hazard preparedness, following Paton et al. (2010) who suggest that mainstream community

312 activities can increase the likelihood of developing preparedness among neighbours. The organisation
313 of participatory experiences (neighbourhood solidarity, earthquake simulators, seismic and tsunami
314 drills in suburbs, towns or at work, etc.) is to be encouraged. The creation of a special day dedicated
315 to an historical or recently felt earthquake would be another opportunity for community actions,
316 following the model of “shakeout” drills (www.shakeout.org) initially organized by the Earthquake
317 Country Alliance of California (2003).

318 On a technical point of view, the training courses and booklets for building professionals have to be
319 strongly simplified for small builders or individual masons in order to attract more such artisans,
320 using another similar experience (Adams, 2009). Simplifications should help to avoid
321 misunderstandings and comply with vernacular traditions (Spence, 2007), demonstrations of the
322 techniques in the field would be extended to ensure a more successful course (Leslie, 1984).

323

324 **Conclusions**

325 At the beginning of the Réplik campaign in 2006, public awareness was quite low in Martinique
326 despite historical events and recent earthquakes. The Réplik actions significantly raised an interest
327 and its set points are now known by most of Martinicans, especially through TV and radio which
328 prove the most efficient vectors. However, despite efforts on the part of the Réplik group to assess
329 the efficiency of educational actions, this paper outlines a growing gap between the observed
330 awareness and the actual preparedness of the public. As usual, gender, age, educational level,
331 boredom, saturation, but also Martinique’s culture may explain this discrepancy.

332 To remain attractive and efficient and to respond to this public’s expectations and needs, Réplik has
333 to upgrade its appeal. An opportunity lies in the coming second phase of the Antilles Earthquake
334 Plan, to anchor existing actions or successful overseas experiences much more into local culture:
335 consideration of cultural beliefs and religion to maintain the congruence with information, use of
336 Creole language, specific education to specific people, participatory experiences, seismic and
337 tsunami drills,, with a little bit of science to maintain a moderate level of knowledge. This is thought
338 to increase people’s involvement in the construction of preparedness. Thus, one can hope that
339 Martinique will rapidly be able to cope with a strong earthquake, and this know-how will benefit
340 other seismically active islands in the Caribbean.

341

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349 reports are freely downloadable from www.brgm.fr and numerical matter from Réplik is available
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541 **Figures**

542

543 **Fig. 1:** Sketch-map of Martinique Island within the Caribbean-Atlantic plate-boundary setting. The
544 main regional faults and earthquakes are illustrated. The large arrow represents the motion of the
545 Atlantic plate relative to the Caribbean plate (from Lopez et al., 2006).

546

547 **Fig. 2:** The Martinique mountainous topography culminates at Mount Pelée volcano (1397 m; 4 583
548 ft). The island is divided into 34 municipalities; Roman letters plotted into municipalities areas
549 represent the EMS98 intensities evaluated after the M7.4, November 2007 slab earthquake (data from
550 BCSF, 2008).

551

552 **Fig. 3:** Examples of Réplik information supports. A) The Réplik logo since 2006; B) Tsunami leaflet;
553 C) Arts exhibition “haz’arts”; D) Video series featuring a Martinican family; E) Simplified technical
554 brochure for construction; F) Magnet with dos and don’ts; G) Instructions poster drawn by children;
555 H) theatre skit of “Tranblad” which means “shaking” in Creole (featuring an authentic childbirth
556 during the 2007 earthquake).

557

558 **Fig. 4:** Evolution of awareness and of several preparedness topics among successive polls within the
559 Martinique population from 1999 to 2010. A) Notoriety of Réplik actions; B) Perception of
560 prevention and preparedness actions.

561

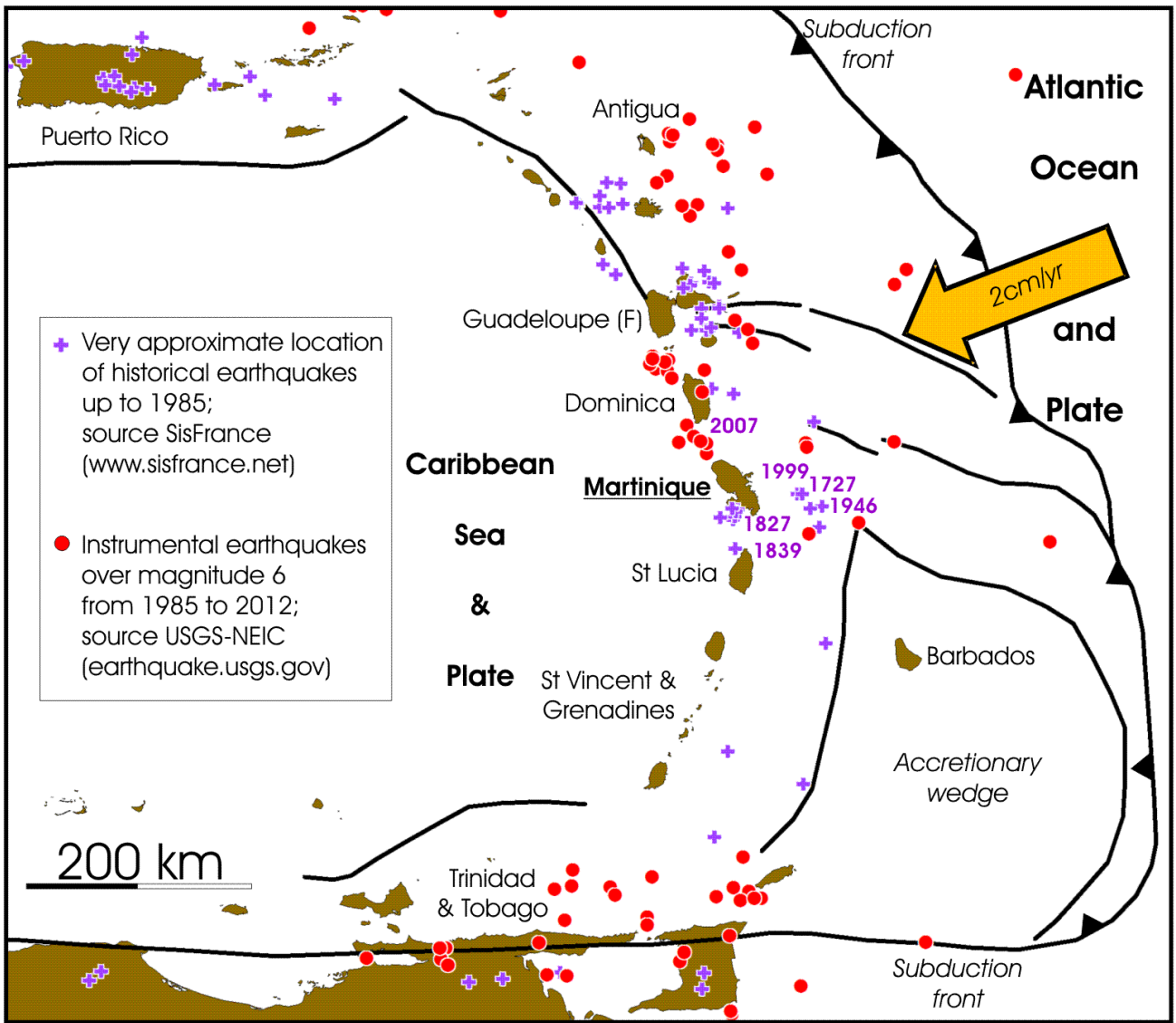


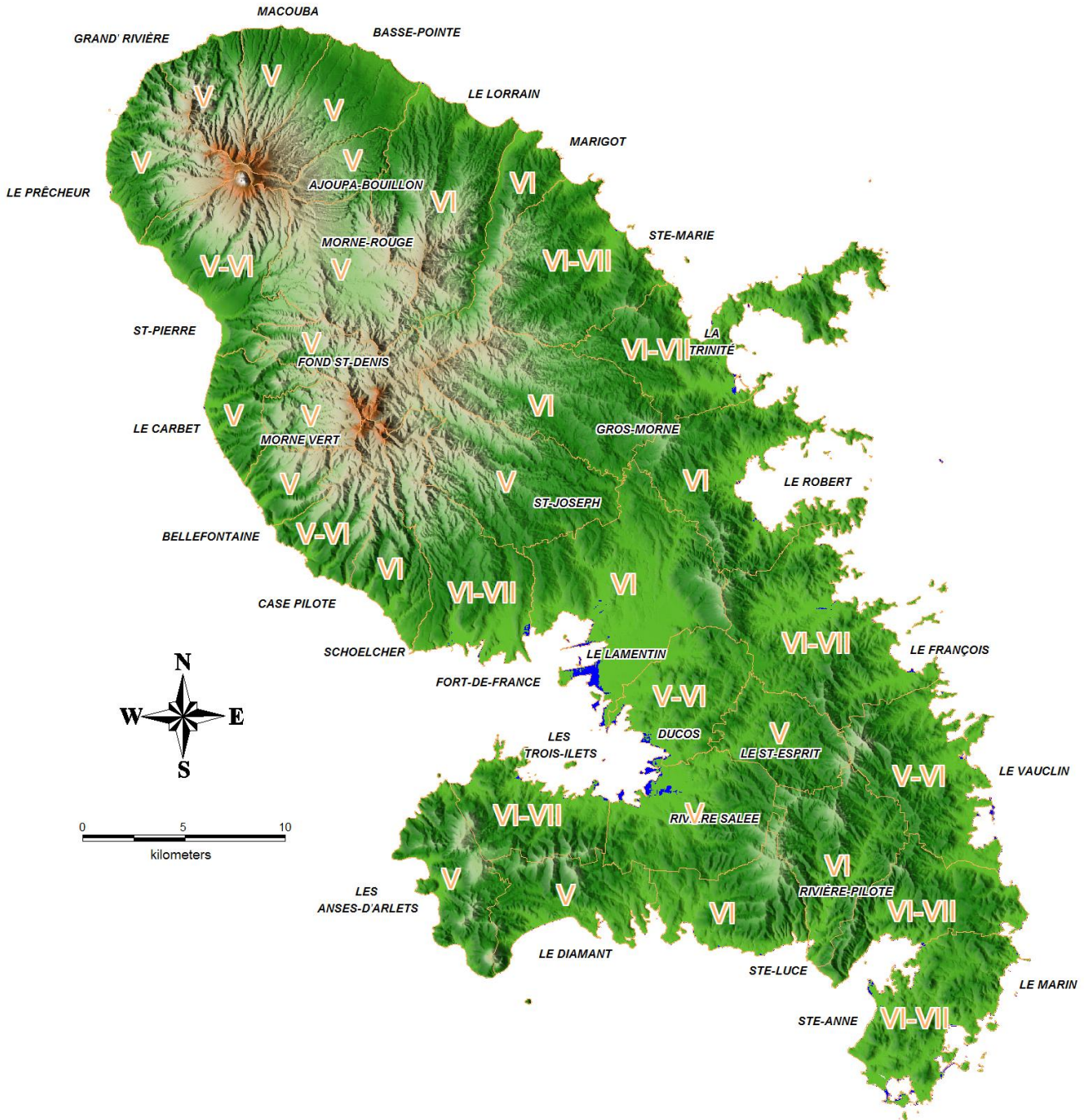
Figure 1

562

563



**EPICENTER OF THE
M7.4, 2007 EARTHQUAKE**



564

565

FIGURE 2

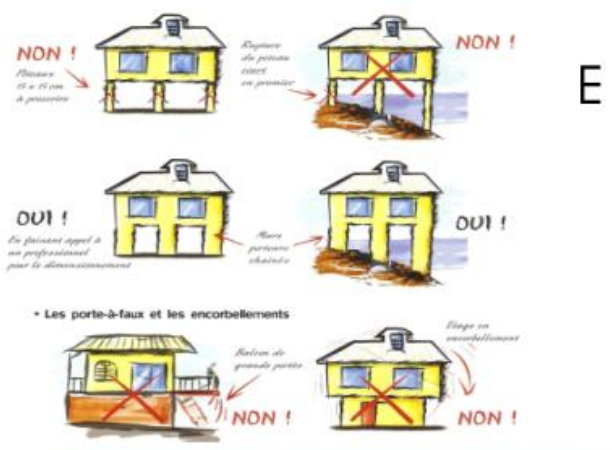
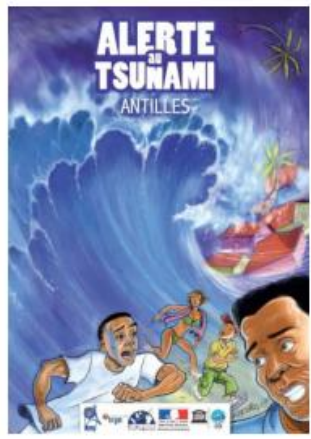


Figure 3

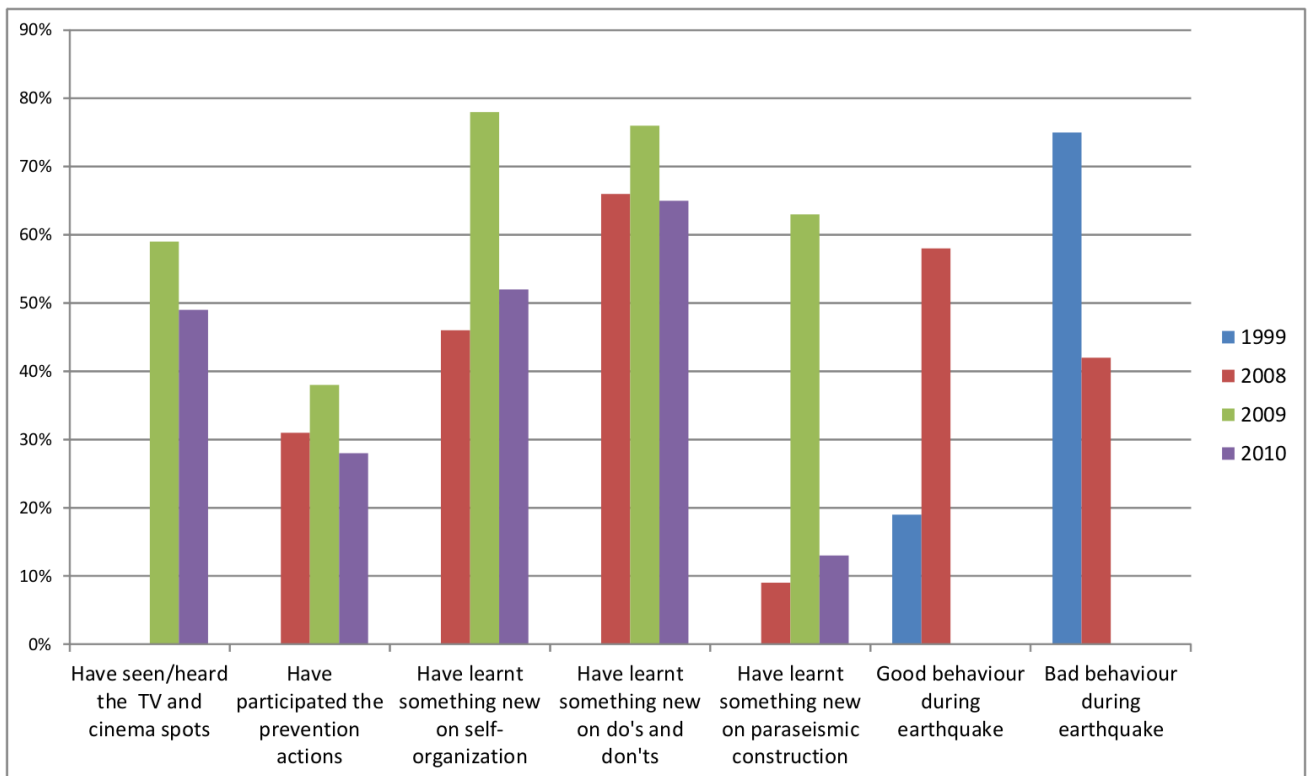
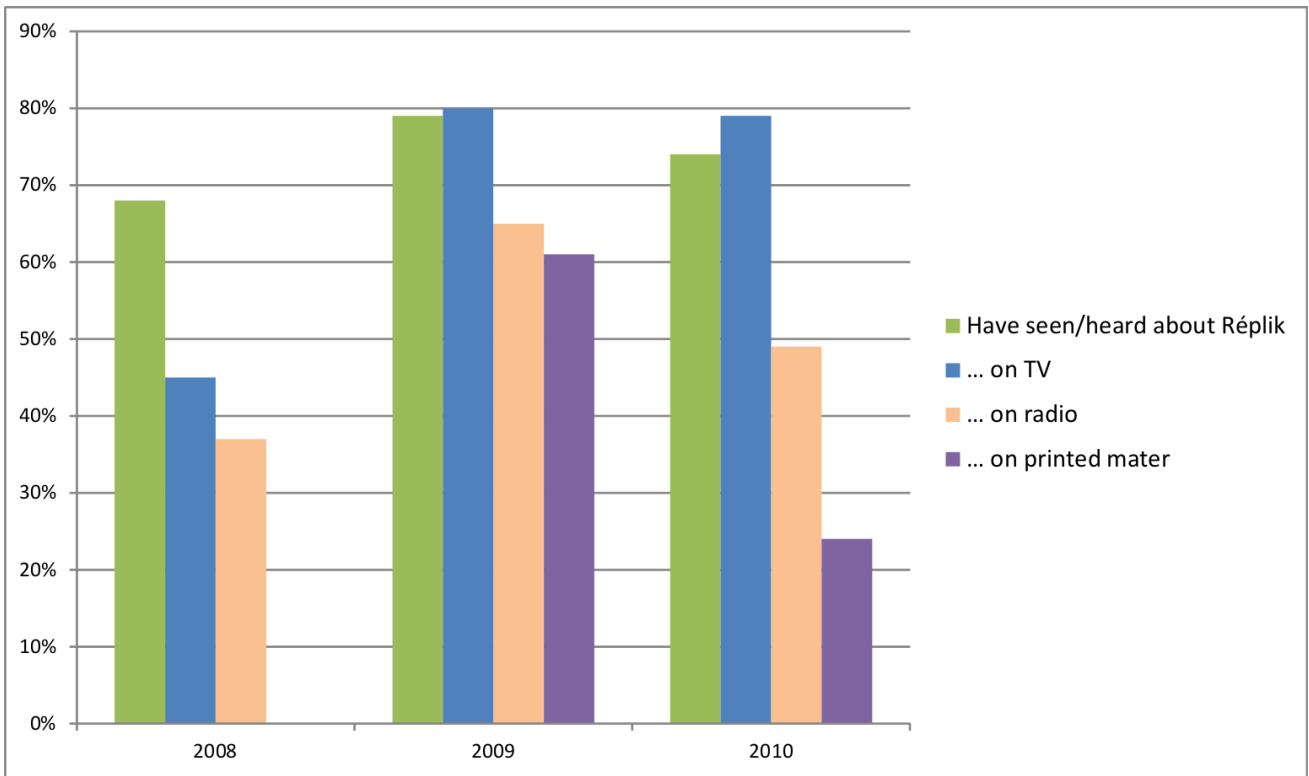


Figure 4