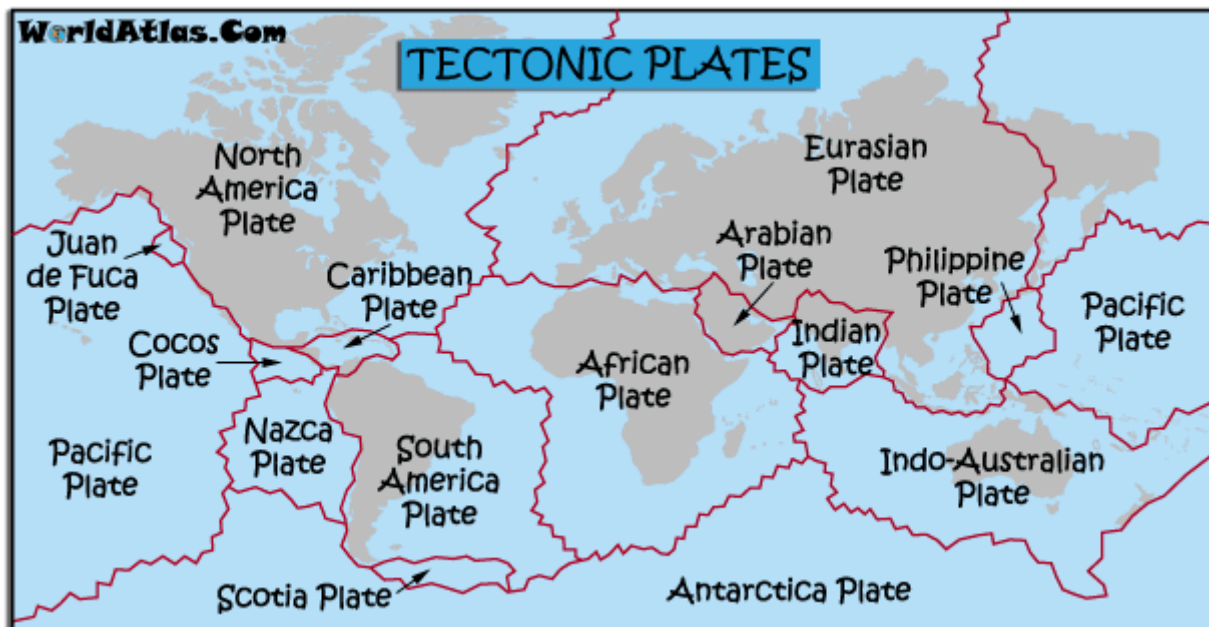


## Haiti earthquake: another development problem

On January 12<sup>th</sup> in 2010, at about 4pm (local Haiti time), an earthquake hit Haiti. The friction of the Caribbean tectonic plate and the North America one brought a dramatic seismic shake. Considering everything, its 7.0 magnitude in Richter scale it is not enough to explain this tragedy.



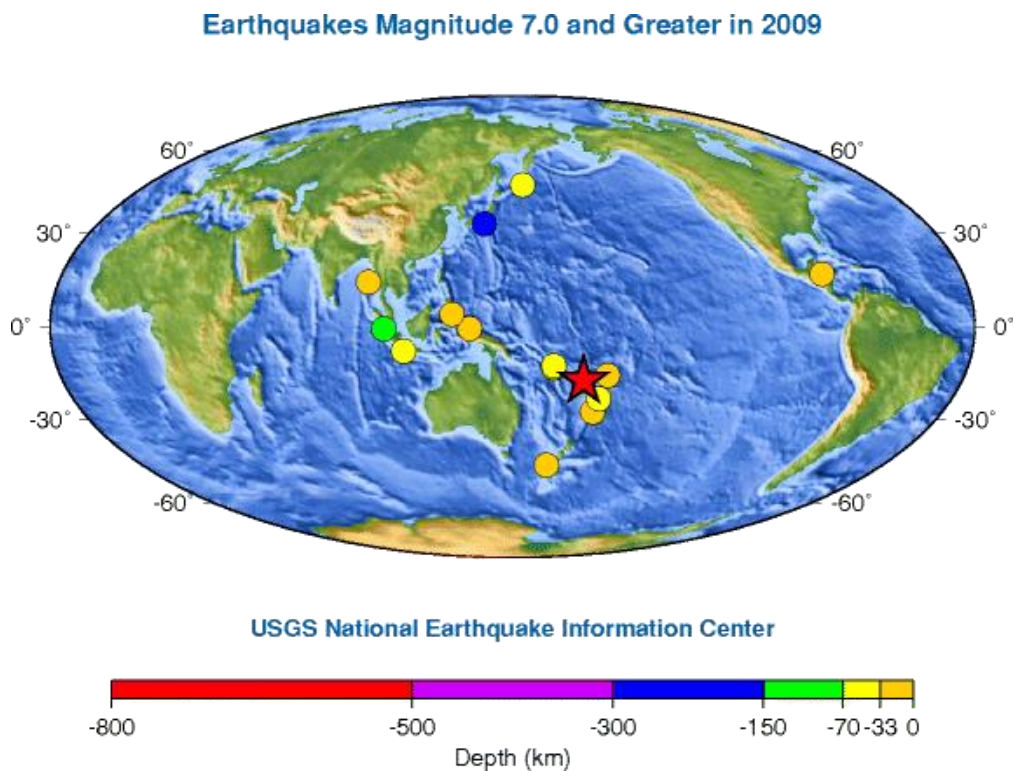
*Image 1: Oversimplified representation of the tectonic plates. Observe the friction zone between the Caribbean plate and the North America one, which are responsible for Haiti earthquake. Source: WorldAtlas.com.*

Richter magnitude scale was developed in 1935 by Charles F. Richter of the California Institute of Technology. According to this scale, the magnitude is calculated from the amplitude of the largest seismic wave recorded for the earthquake. Due to the logarithmic nature of the scale, every increase in an earthquake magnitude whole number, represents a 10 times increase on waves amplitude and it is associated, at the same time, with about 30 of the liberated energy which formula is  $E = 1.74 \times 10^{(5 \times 1.44M)}$ , measured in Joules.

Magnitude	Mean number per year	Typical effects	Liberated energy of the bold numbers magnitude (Joules)
< 3.4	800.000	Detected by seismographs	$1.37 \times 10^{10}$
3.5-4.2	30.000	Felt inside of buildings	$1.91 \times 10^{10}$

4.3-4.8	4.800	Felt by the most people, window shaking	$2.71 \times 10^{11}$
5.5-6.1	500	Light damages on buildings, cracks, falling objects	$1.45 \times 10^{13}$
6.2-6.9	100	Significant damages: building pieces falling, damages to building foundations	$1.47 \times 10^{14}$
7.0-7.3	15	Serious damages: bridge twisting, faults on walls, possibilities of building collapse	$2.09 \times 10^{15}$
7.4-7.9	4	Big damages, collapse of the most buildings	$7.88 \times 10^{15}$
> 8.0	One every 5-10 years	Total destruction, waves on the ground, etc.	$5.70 \times 10^{16}$

According to the United States Geological Survey, in already 2010 a magnitude 7.1 earthquake struck Solomon Islands and nobody was killed; in 2009, 17 earthquakes with an equal or more intensity were detected, and the Sumatra's one was the most dramatic, as it killed 1117 people (Image 2).

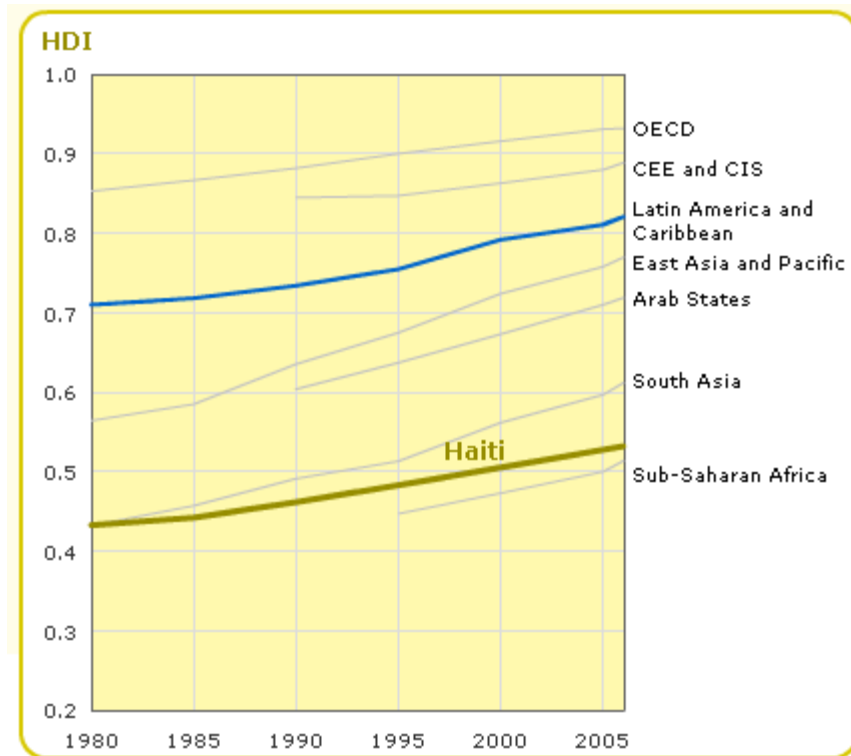


**Image 2: Magnitude 7.0 or bigger earthquakes in 2009. Source: United States Geological Survey.**

In XXI century, ten of the earthquakes killed more than 1000 people. This earthquakes had between 6.1 (2001, Afghanistan) and 9.1 (2004, South-East Asia). The last one, resulting the tsunami, killed more than 200.000 people (for a full list of earthquakes with 1000 or more deaths since 1900, see <http://earthquake.usgs.gov/earthquakes/world/worlddeaths.php>). The affected countries as India, Sri Lanka, Indonesia, Iran, Pakistan, Argelia, China, and their intensity level, seems to proof that for understanding the earthquakes consequences, there must be considered additional geophysical variables, for example, its depth or the tsunami and crumbling focus, etc..

But there are also other significant factors to be considered, as the geographical, demographical and socioeconomic features of the affected zone: distance from the population core, number of inhabitants, population density, type of settlement, and also the preparation of the country on preventing the disaster consequences and mitigating them quickly. So, it's very well-known the Japanese mastery of resistant buildings or the initiative of numerous Californian counties on giving people behaviour protocols in case of emergency. San Bernardino county, was hit by Landers earthquake in the action zone of the San Andreas fault. Although its 7.3 magnitude, it brought material damages and only killed one person. The inhabitants of the county are provided with easily accessible official information about what to do in case of seismic events (<http://www.sbcounty.gov/bosd1/earthquakepreparedness.aspx>).

It is also very obvious that, even though the governmental actions after the 2009 Aquila earthquake is very controversial, the power of the Italian state makes the affected people to have at present better conditions than those that will have the Haitians one year after the seismic shake. Then, Haiti's fault is not the geophysical problem, but the development. The Human Development Index, measured regularly by the United Nations Development Programme (UNDP) represents an evaluation that considers three different dimensions of the human development: living a large and wealthy life (measured from the life expectancy at birth), education access (measured from the adults literacy rate and the massive access to the educational system) and the life standard (measured from the buying power and the population incomes). The HDI value ranges between 1.0 (maximal development level) and 0.0 (minimal level). Even though this index has serious faults, for example the reject of the incomes iniquity problems or the existence of excluded groups of people, it can give us information about the development of countries, at least in a comparative way. So, Haiti (0,532 in 2009, ranking 149 of 182 countries) it's almost on the same level as Sub-Saharan Africa and backward by comparison to its Centre-American neighbours (see Image 3 and <http://hdrstats.undp.org/se/countries/countryfactsheets/ctyfsHTI.html> for more information). Haiti HDI contrasts with the high level HDI of the previously mentioned countries (Japan: 0.960, 10<sup>th</sup>; United States: 0956, 13<sup>th</sup>; Italy: 0.951, 18<sup>th</sup>).



Source: Indicator table G of the Human Development Report 2009

**Image 3: Human Development Index 1980-2005 for Haiti and several world regions. Source: UNDP.**

Obviously, the delayed development of the country (caused by certain historical and geopolitical reasons) disables the Haitian state to carry out preventive strategies for this or other kind of natural hazards (recently, it had been affected by several hurricanes). Haiti neither can face up to the consequences by itself, nor guarantee minimal conditions for being helped efficiently. **Our global world should take note and work seriously for the sustainable development of all the countries, and not to help needy zones just in case of disaster.**

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