**Climate Change and Tectonic Hazards – the Missing Links?**

Using all your powers of detection and deduction, try to **solve** this puzzle. What are the links between climate change, and the frequency and impact of tectonic hazards over time?

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| The Earth's climate has changed throughout history. Just in the last 650,000 years there have been seven cycles of glacial advance and retreat, with the abrupt end of the last ice age about 7,000 years ago marking the beginning of the modern climate era — and of human civilization. Most of these climate changes are attributed to very small variations in Earth’s orbit that change the amount of solar energy our planet receives. | By 2030 about 600 000 square miles of currently ‘rural; land will become urban – that’s an area twice the size of Texas, roughly the size of Mongolia. | The current warming trend in global temperatures is of particular significance because most of it is very likely human-induced and proceeding at a rate that is unprecedented in the past 1,300 years. |
| Human beings have enhanced the greenhouse effect by releasing more greenhouse gases such as methane (CH4) and carbon dioxide (CO2) into the atmosphere. By removing forests for farming (CO2), burning fossil fuels (CO2), growing rice (CH4) and keep cattle (CH4) people are increasing the amount of solar energy trapped by the atmosphere.  | A research project in 2011 found that the factors that contributed most to the impact of tectonic hazards were: poverty; building collapse; construction methods; secondary hazards; levels of response and preparation. | Statistics on major disasters are complex to collect, especially in remote rural areas of developing countries or densely populated squatter settlements where statistics on population are inaccurate. |
| The world’s population reached 7 billion in 2011. Much of this growth is in urban areas and by 2050 70% of the world’s population will be urban. This means that the number of people living with the threat of earthquakes in cities could triple. | Global sea level rose about 17 centimetres (6.7 inches) in the last century. The rate in the last decade, however, is nearly double that of the last century. | Since 1980, the average annual economic cost of natural hazards has risen from less than $20 billion to more than $160 billion. In the same period, the number of people reported as being affected has risen from an annual average of 100 million to more than 200 million. (Warn et al, 2008) |
| During the period from 1900 to 1940, approximately 500,000 people were reported to have been killed by natural disasters each year. After 1940, however, this annual death toll rapidly decreased, to the point where in the early part of this century, the number of people killed by natural disasters each year is less than 50,000. (Warn et al 2008). | Time-trend analysis, which involves interpreting historical data to produce trends, can be difficult. Much depends on the intervals selected and whether the means of data collection have remained constant.  | All three major global surface temperature reconstructions show that Earth has warmed since 1880. Most of this warming has occurred since the 1970s, with the 20 warmest years having occurred since 1981 and with all 10 of the warmest years occurring in the past 12 years. Even though the 2000s witnessed a solar output decline resulting in an unusually deep solar minimum in 2007-2009, surface temperatures continue to increase. |
| A rising global population is increasing demands for food, water, shelter and the resources needed to lead a decent quality of life. This places pressure of finite and unequally divided resources. |

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| Risk = | H x V |
| C |

Where:H = Frequency or Magnitude of hazardV = Vulnerability to hazardC = Capacity to cope/recover | Trends can be upset by a cluster of mega disasters, and some years are exceptions. Several huge disasters made 2004-05 unforgettable, the south Asia tsunami which killed an estimated 250,000 and the Kashmir earthquake which claimed 75,000 lives. In 2010 the Haitian earthquake increased the statistics about the impact of hazards significantly. |
| The Greenland and Antarctic ice sheets have decreased in mass. Data from NASA's Gravity Recovery and Climate Experiment show Greenland lost 150 to 250 cubic kilometres (36 to 60 cubic miles) of ice per year between 2002 and 2006, while Antarctica lost about 152 cubic kilometres (36 cubic miles) of ice between 2002 and 2005. | The rate of population growth is much faster in LEDCs and RICs than it is in NICs and MEDCs. | The gap between the least wealthy countries and most wealthy countries in the world has been growing. |

* increasing vulnerability
* unequal capacity to predict and respond