DON’T PANIC

The 2011 Tohoku-oki earthquake off the coast of Japan was the fifth earthquake since 2004 of magnitude 8.5 or greater (the others include the 2010 Maule earthquake off the coast of Chile and three off the island of Sumatra in Indonesia). This global recurrence rate is certainly higher than historical records indicate—the last major earthquake before these occurred in 1965 off the coast of Alaska, USA. In the past decade, several smaller-magnitude earthquakes with large numbers of fatalities in Haiti, China, Pakistan, and elsewhere have added fuel to the speculation that Earth is experiencing an era of increased seismicity, and therefore, global risk from future large earthquakes has increased. But could this simply be the result of a random variability of earthquakes across many unrelated faults and different types of plate boundaries? Michael ran three statistical tests using the record of magnitude 7.0 earthquakes since 1900 to resolve this dilemma. The tests rule out any statistically significant clustering and suggest that global triggering of large earthquakes by other earthquakes, except for aftershocks, is not occurring. Recent seismicity can be described by random and high variability of low-rate events within a Poisson process rather than clusters of related events. Global seismic hazard estimates should therefore not be adjusted to account only for the recent past; seismic risk should remain calculated based on the entire earthquake record, which, in some cases, stretches back thousands of years. — NW


CLIMATE SCIENCE

Taking Greenland’s Temperature

The climate warming that has occurred over the past century in Greenland has been much more pronounced than the concurrent hemispheric or global average temperature increases as a whole. Such a large and rapid local rise in temperature has raised considerable concern about effects on the Greenland ice sheet and sea level more broadly, and questions about how much of the temperature rise is natural and how much has been caused by humans. Kobashi et al. construct a proxy record for Greenland surface air temperature over the past 4000 years, using argon and nitrogen isotopic ratios from air bubbles occluded in the ice, in order to establish useful estimates of the natural variability of temperature there. They find that the current decadal mean temperature has not exceeded the highest values of the past 4 millennia, which occurred during the Holocene Thermal Maximum, but that the temperature can be expected to rise above those values before the year 2100 if the projections of climate models are correct. — HJS


NEUROSCIENCE

Perfecting the Not Quite Perfect

Even the best musicians make slight errors when playing a rhythm. We find this frailty to be appealing, as evidenced by the fact that computer-generated perfect rhythms are often perceived as sterile or artificial. Having known this phenomenon for a long time, software engineers have added slight rhythmic fluctuations to make computer-generated music sound more human. These fluctuations are usually produced by a random number generator. Hennig et al. have now analyzed the statistical properties of music produced by professional musicians. They found that there are long-range fluctuations in the random number–generated fluctuations. The authors conclude that these results may not only have practical implications such as improved techniques for audio editing and humanizing music, but they may also provide new insights into the neurophysiology of time perception and timing of actions. — PRS


COMPUTATIONAL BIOLOGY

Finding the Perfect Recipe

Computer games? What a waste of time. And online multiplayer ones? Even more so. But hold on … you clearly haven’t heard about “Foldit.” This free online game allows players (singly or in teams) to use simple tools (for example something the gamers know as shake, but which is in fact an automated combinatorial side chain rotamer packing tool) to fold polypeptide chains into chemically realistic three-dimensional protein structures. It is more than a useful education tool, though, as has been previously shown through the solution of the structure of a retroviral protease, and as Khatib et al. now further demonstrate. Within the game, players were allowed to codify the strategies and tricks they used to create accurate models of proteins in the form of “macros” or “recipes.” Furthermore, they could also edit and share recipes. Analyses of recipe use showed that recipes augmented—but did not substitute for—gamer strategizing, and that certain recipes spread widely through the gamer population, undergoing further modification (“evolution”) as they were adopted by more and more gamers. One of the most highly

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