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Geohazards and geodisasters: Natural and human consequences

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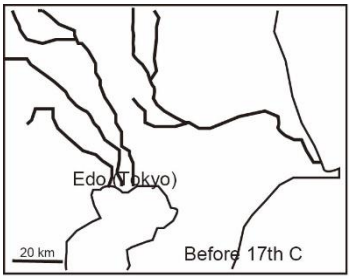
Beyond the human activities are pure natural phenomena, some of them are extremely rare examples that cannot be overcome by any prevention, but as for the relatively frequent, common disasters, such as floods and ordinary earthquake shakes, tsunamis etc., attack definite areas where humankinds live to bring minus results as disasters. Because the humankinds live in such hazardous areas, it could be partly mitigated by our science and technology if the adequate preparedness was applied before the disasters. Here is the major topic between hazard (potential cause for future disaster) and disaster (negative results of hazards). In other words, most of the common, plausible future disasters could be prevented by our effective preparedness, some by scientific, some by technological, and some by human and social sciences including political efforts as governance structures (Ogawa [1], Ogawa et al. [2]). Among them the exogenic factors of hazards are mostly natural, whereas endogenic are human.

The Kanto Plain of central Japan, where Tokyo Municipal (formerly called Edo, Fig. 1) is located, has NE-ward and NW-ward inclining crustal movement due to the Boso triple junction tectonism, which controls as the three drainage systems are natural until the medieval age (before 17th C), but after the cutting and changing of the drains to new systems (Fig. 1), mostly by the Tokugawa Shoguns during 17th C, the areas suffered different disasters. Such changes made other conditions for further hazards in another area. Also large-scale volcanic eruption of AD 1703-04 Asama Volcano to the NW of Edo (Tokyo) supplied abundant clastics to the rivers, making the river floor buried by deposition, then the Shoguns' and next modern governmental treatment of higher and higher bank construction made these areas to be further hazardous. The new systems against the natural inclination made a dangerous damming if extraordinary rain precipitation occurred (probably due to the extreme climatological conditions), then the up-flow of the other river occurred to overflow in rare flood areas. This is actually occurring in September 2015 of the Kinu River flood (Ogawa [1]). We learned if the natural drainage systems were kept, the flood would be further less. Such human-related disasters are common in other fields of study, e.g. the higher banks against tsunamis in the Tohoku area, incomplete (or too much conservative) hazard maps, or less preparedness. Some stochastic consideration is effective only if we think the probability discussion is perfect. We should further be aware of any possible preparedness (Ogawa et al. [2]).



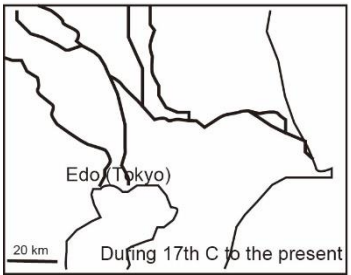


Figure 1: Historic change of drainage systems of Kanto Plain before (above) and during 17th Century to the present (below).

Reference:

[1] Ogawa Y (2015) IUGS E-Bulletin: #112, http://iugs.org/uploads/IUGS%20Bulletin%20112.pdf

[2] Ogawa Y, Dilek, Y and Takarada, S (eds) (2014) *Episodes* 37 (4): *Geohazards in Subduction Zone Environments and their Implications for Science and Society* http://www.iugs.org/uploads/Sendai%20News-2-1.pdf