



Hydrodynamics vulnerabilities related to sea level increase and tropical storms: adaptation physical actions and risks management maps - The case of the Guanabara Bay in Rio de Janeiro - Brazil

G. Lacerda (1), E. Andrade (1), M. Freitas (2), and L. Assad (3)

(1) Programa de Planejamento Energético/COPPE/UFRJ, Rio de Janeiro, Brasil (mamede@ppe.ufrj.br), (2) IVIG/COPPE/UFRJ, Rio de Janeiro, Brasil (mfreitas@ppe.ufrj.br), (3) LAMCE/COPPE/UFRJ, Rio de Janeiro, Brasil (thecnna@thecnna.com)

The absence of studies about environmental risks and extreme natural events leads to incomplete Preliminary Risk Analysis (PRA). This hole is confirmed in contingency and emergency plans and could compromise the physical, financial, social and environmental integrity in industrial plants as in that communities located around. It is possible to observe that even though problems, risks and danger evidences enhance in whole planet only a few public politics or private instruments are effective in decrease these impacts. Semi closed coastal water bodies such as Guanabara Bay located in Rio de Janeiro state (Brazil) suffer significant influence of tides and are periodically influenced by natural extreme events such as hangovers and storm surges. These natural processes are responsible for coastal water stack over these coastal environments. These natural events tend to become increasingly frequent and of greater magnitude with the development of global warming process. This work aims to study environmental planning and management of extreme natural events, in a specific coastal environment, related with the mean sea level increase due to global warming process. This work focused in the flooding area located inside an oil industry plant located in the Guanabara Bay. There were elaborated three different scenarios of mean sea level increase for which were observed its impacts. It was used the IPCC (Intergovernmental Panel on Climate Change) dataset specifically from the Stern relatory. The superposition of sea level values related with tides data and storm surges events was studied revealed critic and vulnerable climate scenarios associated with the hydrodynamics around the studied island and its installations. After the elaboration of the scenarios it was also elaborated water range maps over the island industrial plant with some response actions proposals including physical adaptation actions and a list of actions for each simulated scenario. These actions are basically related with engineering interventions that permits emergency responses. These adaptative planning and management risk actions would permit the continuity of the essential activities such as oil supply and its derivatives in the oil industry plat. These proposal activities would also avoid marine pollution accidents and social – economical problems such as direct and indirect job losses.

Keywords: Natural extreme risks, flooding area, sea level increase, adaptation.