

MIASMA (Modeling Framework for the Health Impact Assessment of Man-Induced Atmospheric Changes)

Description	MIASMA is a Windows-based modeling application that models several health impacts of global atmospheric change and include simulation for several modules: 1) vector-borne diseases, including malaria, dengue fever, and schistosomiasis; 2) thermal heat mortality; and 3) UV-related skin cancer due to stratospheric ozone depletion. The models are driven by both population and climate/atmospheric scenarios, applied across baseline data on disease incidence and prevalence, climate conditions, and the state of the stratospheric ozone layer.
Appropriate Use	MIASMA can be used to link GCM output of climate change or scenarios of stratospheric ozone depletion to any of the human health outcomes mentioned above. Applicability of this model is limited only by the scope of available data.
Scope	Health; regional and global analysis.
Key Output	For the thermal stress module: cardiovascular, respiratory, and total mortality; for skin cancer module: malignant melanoma and nonmelanoma skin cancer; for vector-borne disease modules: cases and fatalities from malaria, and incident cases for dengue fever and schistosomiasis.
Key Input	Climate input is module or disease specific. For thermal stress, maximum and minimum temperature are required. For skin cancer, the column loss of the stratospheric ozone over the site is required to determine the level of UV-B radiation potentially reaching the ground. Requires maximum and minimum temperature and rainfall. Vector-borne diseases also require other baseline data, determinable by local experts. For example, for malaria it would help to know the level of partial immunity in the human population and the extent of drug resistant malaria in the region.
Ease of Use	After a short training, the computer simulations should not be difficult.
Training Required	Requires familiarity with computer modeling; some mathematical skills may be beneficial.
Training Available	Dr. Pim Martens (see Contacts below).
Computer Requirements	Pentium PC, 16 MB RAM, Windows 95 or NT4 or higher. For hard drive installation: 20 MB free disk space. A monitor resolution of 1074 x 768 is recommended. To view the documentation and help files, either Netscape Navigator (version 4 or higher) or Microsoft Internet Explorer (version 4 or higher) is recommended.
Documentation	Martens, P. 1998. <i>Health and Climate Change: Modeling the Impacts of Global Warming and Ozone Depletion</i> . Earthscan Publications, London.
Applications	Thermal stress module has been applied to 20 international cities. Skin cancer module has been applied to The Netherlands and Australia. Vector-borne disease module has been used globally, malaria module in Zimbabwe, and dengue module for Bangkok, San Juan, Mexico City, Athens, and Philadelphia.
Contacts for Tools, Documentation, Technical Assistance	Dr. Pim Martens, ICIS, P.O. Box 616, 6200 MD Maastricht, The Netherlands; Tel: 31.43.388.3555; Fax: 31.43.321.1889; e-mail: p.martens@icis.unimaas.nl .
Cost	Low cost (price of shipping CD-ROM and documentation).

MIASMA (Modeling Framework for the Health Impact Assessment of Man-Induced Atmospheric Changes) (cont.)

<i>References</i>	Martens, W. 1997. Health Impacts of Climate Change and Ozone Depletion: An Eco-Epidemiological Modelling Approach. Dept. Mathematics. Maastricht, University of Maastricht. Martens, W.J.M. 1998. Climate change, thermal stress and mortality changes. <i>Soc. Sci. Med.</i> 46(3):331-344. Martens, W.J.M., T.H. Jetten et al. 1995. Climate change and vector-borne diseases: A global modelling perspective. <i>Global Environmental Change</i> 5(3):195-209. Martens, W.J.M., T.H. Jetten et al. 1997. Sensitivity of malaria, schistosomiasis, and dengue to global warming. <i>Climatic Change</i> 35:145-156.
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