Draft contribution to application paper for main phase –

Climate modelling for Iran with ECHAM/REMO and downscaling of meteorological surface parameters

1. Problem Outline (Problemstellung)

The greater area of Tehran is a very dynamical growing region with rising severe problems with respect to future development of emissions and the ventilation within cities, the overall growth of e.g. suburban areas, housing, traffic and industrial areas. The technical and industrial standards are overall comparable to Europe, so that the strategies and instruments developed in Europe can be applied to that region.

For the development of strategies in cooperation with the Iranian institutions and planning to overcome the environmental and energy problems in the Cities the analysis of regional climate simulations and modelling exercises is desired and will be used for Iran the first time. Of strong interest is the preparation of relevant emission informations for energy, green house gases, anthropogenic and natural pollutants in the Near East relevant for climate modelling.

2. Aims (Ziele)

- For the first time the regional climate model REMO (MPI Hamburg) will be applied to Iran and the Middle East with a horizontal grid resolution of about 10 km.

- By downscaling of the regional model output with Neurofuzzy models and climate data a higher resoluted information for a 1 km² grid will be developed for the Hashtgert and Tehran area in cooperation to ASMERC.

- The regional anthropogenic and natural emission maps of relevant gases and particles will be prepared by use and combination of existing international and Iranian emission inventories. Estimations of landuse changes and additional changes of energy and pollutants emissions especially from this project will be uses to create scenarios for regional and global climate modelling (The Seventh Framework Programme, project proposal Megapoli).

3. Research Activities (Forschungsarbeiten)

- At the MPI fM Hamburg the regional climate model REMO will be installed for Iran.

- A base run with ECMWF/REMO will be prepared for the last 50 years today climate.

- By use of Iranian time series of meteorological and chemical parameters Neurofuzzy models will be developed for downscaling for the last 30 years (1 km² grid).

- These data (temperature, wind, radiation components and others) will be presented to the project groups.

- High resolution cadastral survey of emissions (4 to 10 km² grid maps) will be prepared by international and Iranian informations as a base for further development alternatives.

- By utilisation of development studies in Hashtgert and Greater Tehran region the change of land use and emissions of energy and pollutants will be estimated and used in climate simulations to clear up the alternate effects.

- By use of two IPCC-Scenarios and the local estimations future climate changes will be prepared with ECHAM/REMO for two time slices (2040-2050 and 2090- 2100), if possible for 2010-2100.

- The contribution of the Tehran region to the global climate scales will be estimated.

4. Output: Expected Results and Products (Output: Erwartete Ergebnisse und Produkte)

- Climate simulations for today and for the next 100 years in the Near East.

- Emission maps for high resolution (4 to 10 km² grid) and impact of Greater Tehran region and Iran to global emissions.

- Meteorological downscaling procedure for the Iranian climate regions.

5. Monitoring Indicators (Indikator/en zum Monitoring der Ziele)

- Benennung ausgewählter Indikatoren (zu den einzelnen Zielen oder Ziel-übergreifend)
- Darstellung der jeweiligen Monitoring-Methoden (z.B. Simulation etc.)

Indicators