The present paper describes background, mission, research topics, and preliminary results of the research project “Tokyo Metropolitan Area Convection Study for Extreme Weather Resilient Cities (TOMACS)”. TOMACS is one of the research projects of “Social System Reformation Program for Adaptation to Climate Change” which has been started since July 2010 under the “Special Coordination Funds for Promoting Science and Technology” of the Ministry of Education, Culture, Sports, Science and Technology (MEXT). TOMACS aims to understand the processes and mechanisms of extreme weather, using dense meteorological observation networks designed in the Tokyo metropolitan district, to develop a monitoring and predicting system of extreme phenomena (MPSEP), and to implement social experiments on extreme weather resilient cities in collaboration with related government institutions, local governments, private companies, and residents. More than 25 organizations and over 100 people participate in the present research projects.

One of unique features of TOMACS is utilization of dense meteorological instruments in the Tokyo Metropolitan area which is one of the most urbanized areas in the world. The field campaign in the Tokyo metropolitan area, using research instruments and operational meteorological networks is planned by MRI and thirteen groups in the summers of 2011-2013 to target the tropospheric environment, boundary layer, initiation of convections and lifecycle of thunderstorms. Observation on environmental conditions of convections are carried out using radio sonde, wind profiler, GPS network, unmanned air vicle, and network of automated weather stations. Generation and development of convective precipitations are investigated by observations using Doppler lidar, rapid scan geostationary satellite, Ku-band polarimetric radar, X-band polarimetric radar network (X-NET) and C-band research polarimetric radar and C-band operational Doppler radars. Several thunderstorms were captured by the dense meteorological network during 2011 campaign observations. The present paper shows preliminary results of the analysis. Social experiments on extreme weather resilient city using radar networks are also presented.