Flood inundation depth maps Danube catchment (Germany)
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Abstract:
This data set provides a stochastic event set of flood inundation depth maps (fluvial flood hazard footprints) for the German part of the Danube catchment for current and future climate.
The maps provide inundation depth information in cm above ground level on a 100 m grid along the major rivers (4150 km) based on 2D hydro-numeric simulations. Flood event sets are derived for the historical period (1970-1990) and two RCPs (4.5 and 8.5) for the near future (2020-2049) and far future (2070-2099) for four CORDEX models. These flood event sets are created within a continuous long-term simulations of a coupled model chain including the IMAGE stochastic multi-variable, multi-site weather generator, the eco-hydrological model SWIM and 1D river network coupled with 2D hydro-numeric hinterland inundation model.
10,000 years of continuous daily simulation of meteorological fields are available for each time period, rcp and climate model. The current version of the flood inundation data sets includes 100 years of simulations. 1D model cross section geometries are based on 10m DEM (BKG), adjustment of dike heights in model calibration. 2D hinterland simulation using LISFLOOD-FP inertia model on a 100m grid resampled from 10 m DEM.
Key usages of the data are large-scale flood risk assessment, future flood risk assessment and flood risk management with long-term perspective.

The data have been produced within the OASIS+ demonstrator project 'Future Danube Multi Hazard and Risk Model' funded by Climate-KIC in the period from January 2016 to December 2017.

Key features:

- Inundation depth maps for the German part of the Danube catchment from stochastic event sets for current and future climate.
- Inundation depth in meters generated by 2D hydraulic simulations on a 100 m grid along the major rivers (xx km length)
- Inundation scenarios for historical period (1970-1990) and two RCPs (4.5 and 8.5) for the near future (2020-2049) and far future (2070-2099) from four CORDEX models

Key usage:

- Large-scale flood risk assessment
- Future flood risk assessment

- Flood risk management with long-term perspective

Meta-data:
GeoTIFF
Dimensions
X: 4451 Y: 3106 Bands: 1
Origin
4.1647e+06,2.99097e+06
Pixel Size
100,-100
No Data Value
-32768
Data Type
Int16 - Sixteen bit signed integer
Layer Spatial Reference System: EPSG:3035
+proj=laea +lat_0=52 +lon_0=10 +x_0=4321000 +y_0=3210000 +ellps=GRS80 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs
Layer Extent (layer original source projection)
4164699.6715519418939948,2680370.5156931704841554 : 4609799.6715519418939948,2990970.5156931704841554

Data creation:
Continuous long –term simulation using a coupled model chain of IMAGE stochastic multi-variable, multi-site weather generator, eco-hydrological model SWIM and 1D river network coupled with 2D hydro-numeric hinterland inundation model.

Stochastic event set of 10,000 years of continuous daily meteorological fields respectively for RCP 4.5 and 8.5 and each for 4 regional climate models (ICHEC_KNMI, ICHEC_SMHI, MOHC_SMHI, MPI_MPI).

1D model cross section geometries based on 10m DEM (BKG), adjustment of dike heights in model calibration. 2D hinterland simulation using LISFLOOD-FP inertia model on a 100m grid resampled from 10 m DEM.

Map products:
- wd_x.tif: Inundation depth map of maximum inundation depth (cm) for one flood event from the stochastic event set.
- wd_max.tif: Raster indicating the maximum water depth in each pixel in the simulation of 100 years for each scenario and model.
- freq_flood.tif: Inundation frequency map indicating the number of flooding events for each pixel from a within a simulation of 100 years for one scenario and model.

Version and status
V0.1: Preliminary results from model chain set-up v.01_170601, may be subject to changes due to modifications in underlying models.

Scenario specifications:
CMxRCPyTz
T0: reference time period (1970-1999)
T1: near future (2020 – 2049)
T2: far future (2070 – 2099)
RCP4.5: representative concentration pathway 4.5

RCP8.5: representative concentration pathway 8.5
CM1: ICHEC_KNMI, ICHEC_EC,EARTH, Irish centre for high end computing, RACMO_22E_v1, Dutch Meteorological Institute (KNMI) ensemble: r1i1p1
CM2: ICHEC_SMHI, ICHEC_EC_EARTH, Irish centre for high end computing, RCA4_v1, Swedish Meteorological Institute (SMHI) ensemble: r12i1p1
CM3: MOHC_SMHI, HadGEM2-ES, Met Office Hadley Centre UK, RCA4_v1, Swedish Meteorological Institute (SMHI) ensemble: r1i1p1
CM4: MPI, MPI-M-MPI-ESM-LR, Max Planck Institute for Meteorology, REMO2009, MPI and CSC (climate service centre) ensemble: r1i1p1

References:

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