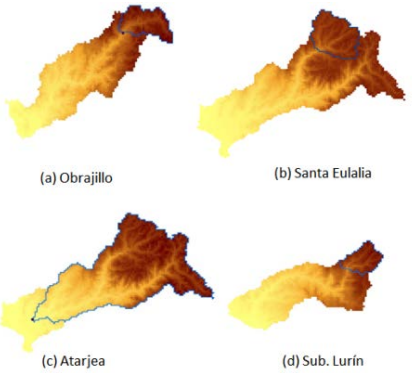
Sustainable Water and Wastewater Management in Urban Growth Centres Coping with Climate Change - Concepts for Lima Metropolitana (Perú) -

Climate change: precipitation, temperature, discharge

Tasks

- Regionalisation of precipitation
- Scale transformation of the data (downscaling)
- Hydrological modelling: Models HBV and Hymod
- Climate change impact: *Precipitation, temperature, discharge*
- Short term forecast
- Trend analysis (precipitation)



Studied catchments: Pacific side

Methodology

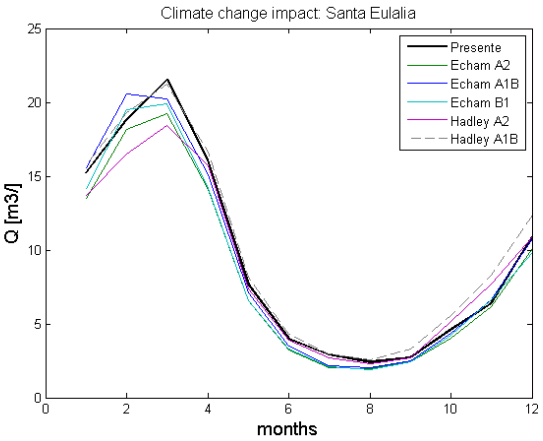
- External drift kriging. Proposed modifications
- Downscaling: Quantil-Quantil transformation
  - Parametric estimation: Weibull and Normal distributions
  - Non parametric estimation: Kernel functions
- HBV and Hymod models
  - Calibration (Simulated Annealing)
  - ROPE algorithm based on “depth functions”
- Short term forecast based on:
  - Autoregressive models and Copula theory
- Time series trend analysis (discharge)
  - Monte Carlo based simulation

$$\vec{v}_d^{\,i}(k) = F_i^{-1}\left[G_i\left(v_m^i(k)\right)\right]$$

Downscaling procedure:
v_d^i: *down. result i; G: control period distr.: F: Observations distr.*

$$P(X \le x'/X_i \le x_i, i = 1, n) = \frac{\int_0^{u'} c(u, u_1, \ldots, u_n)}{c(u_1, \ldots, u_n)}$$

Autorregressive model. c( ): Cópula



Results

- Monthly discharge time series generation
  - Precipitation, temperature and discharge (2012 - 2050)
  - Short term forecast
- Models
  - Hydrological models: HBV and Hymod (Fortran code)
  - Downscaling and forecast (Matlab code)

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