RainPortal

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RainPortal

A Web Portal for Providing Climate
Change Related Precipitation Data
Using SUDPLAN Services

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RainPortal targets on precipitation

- Let's plan some building or infrastructure
  - Urban sewerage systems
  - Waste water treatment plant
 - Or simply a large parking lot

- We need to take weather conditions into account
  - Because we need to know how much water to discharge

- We have knowledge about the weather statistics for the last 30 years

Some aspects of the planning process

- Rain statistic (IDF) describes "worst" rain events as
  - Intensity – mm/h, mm/event or l/s*ha
  - Duration – minutes
  - Frequency – How often to expect this Intensity / Duration combination

- Use the rain statistics for planning
  - What is the strongest rain event I have to plan for?
  - Once a year?
  - Every 10 years?
  - Every 100 years?
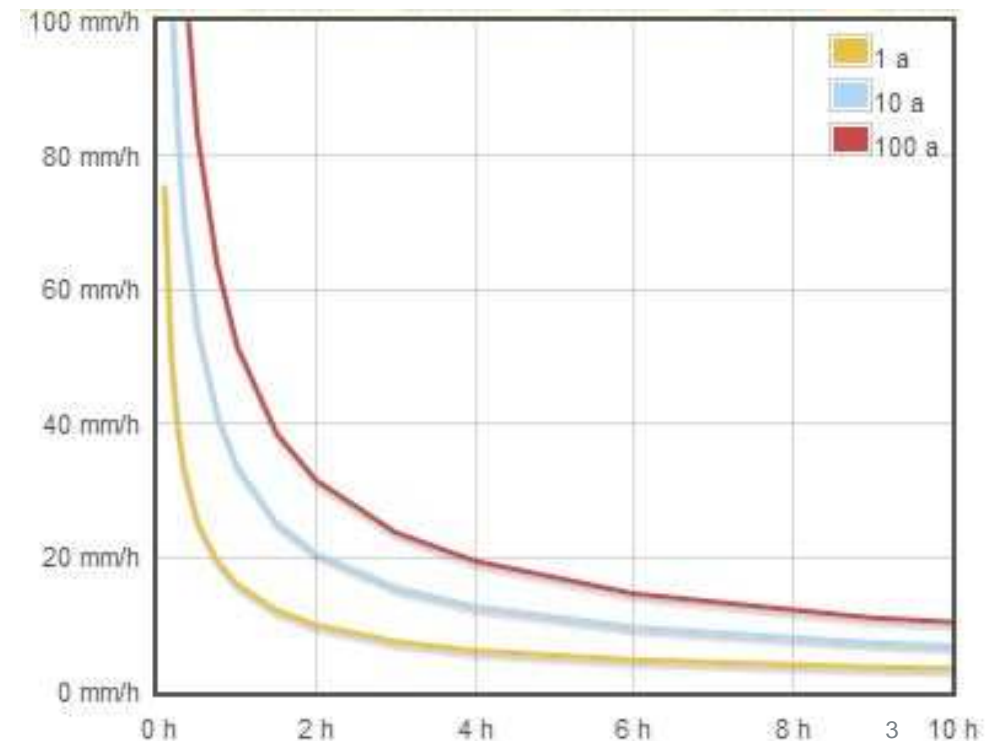
The problem is simple

- If we plan for too strong rain events: Unnecessary costs now
- If we plan for too weak rain events: Much higher costs later

- We have knowledge about the weather statistics from the last 30 years

- But we had some of this "Once every 100 years" events in the last decade!

We have knowledge about the past but we need to plan for the future!

SUDPLAN

- Sustainable Urban Development Planner for Climate Change Adaptation

- Provide data about what to expect
    - Up to year 2100

    - Precipitation
    - Hydrology
    - Air Quality

- In a quality usable for urban planning
    - Temporal and spatial resolution

- For each city in Europe

The solution for our problem

- Take historical data representing your local situation

- Use SUDPLAN services to project them to the future
    - Result has the same structure as the historical data
    - No problem to use them in the existing planning process

- But what will the future climate look like?
    - Different climate models
    - Different IPCC scenarios
    - Global warming does not necessary mean local warming too!

- Different combinations of climate models and IPCC scenarios show the bandwidth of possible future conditions.

Historical Data

IDF – Data:

- Basically an (Duration X Frequency) grid filled with Intensity values
- Might also be normalized to 3 columns

Additional information:

- Geo-reference (WGS84)
- Timespan the IDF data are valid for

Austria: *The Ministry of Life* provides this data for free

- http://www.lebensministerium.at
- http://ehyd.gv.at/

	A	B	C	D	E
1		1	2	3	5
2	5	6,3	8,4	9,5	11,1
3	10	8,4	11,1	12,8	14,9
4	15	9,9	13,2	15,2	17,7
5	20	11	14,7	16,9	23,4
6	30	12,7	17	19,6	22,7

	A	B	C
1	Duration [minutes]	Frequency [years]	Intensity [mm]
2	5	1	6,30
3	10	1	8,40
4	15	1	9,90
5	5	2	8,40
6	10	2	11,10

```
Bemessungsniederschlag h mit MaxMod- und ÖKOSTRA- Niederschlag [mm]
Gitterpunkt: 1036 (M34, R: -94454m, H: 5432657m)
T: Jährlichkeit
DAUER          DAUERMIN     TYP        1T      2T      3T      5T
------------------------------------------------------------------
 5 Minuten      5         MaxModN     6.6     9.1    10.5    12.4
 5 Minuten      5         Bemessung   6.3     8.4     9.5    11.1
 5 Minuten      5         ÖKOSTRA     5.9     7.4     8.2     9.4

10 Minuten     10         MaxModN     8.3    11.5    13.4    15.9
10 Minuten     10         Bemessung   8.4    11.1    12.8    14.9
10 Minuten     10         ÖKOSTRA     8.5    10.7    12.1    13.8
```

lebensministerium.at

1. Load Historical IDF Data

- Load historical data into the browser

- Specify file format, unit, location and reference time

- Data is shown immediately as
  - 2D graph
  - Table
  - Location on a map
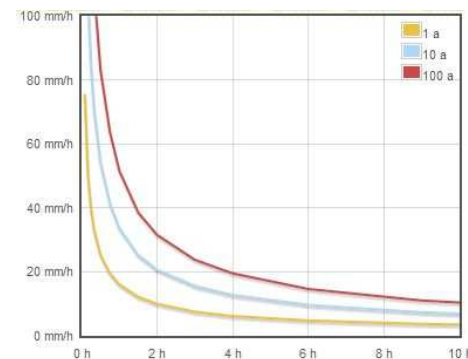
2. Projection to the Future

| 1. Load IDF data | 2. Projection to the future | 3. Visualisation in 3D | 4. Download |

Logged in as http://lr-110.myopenid.com

Projection to the future

(IDF_3412_Neusield_am_See.aidf)

Perform projection to the years around [2070]

The following climate scenarios will be used to calculate minimum and maximum from all results. Simply leave them all checked.
Climate scenarios to use:

☑ ccsm3a1b

☑ echam5a1b3

☑ echam5a21

☑ hadleya1b

[Start projection] (This will upload your data for further processing)

- Set year you are interested in
- Click "Start projection"
    - Now data is sent to the RainPortal server
    - Projection is done on SMHI SUDPLAN server

3. Visualization in 3D

- Click "Check for results"
- Results will be downloaded to the browser
- Shown as
  - Interactive 3D graph
  - Table with all details
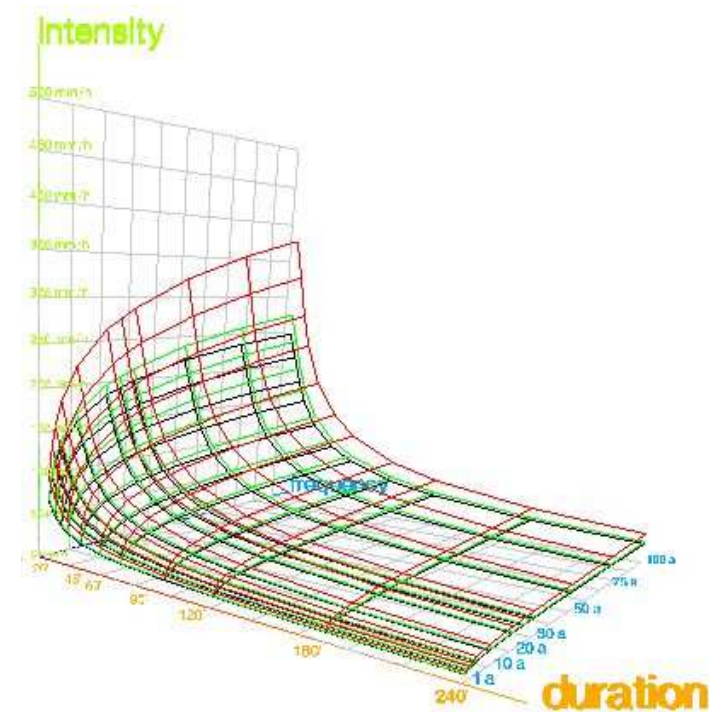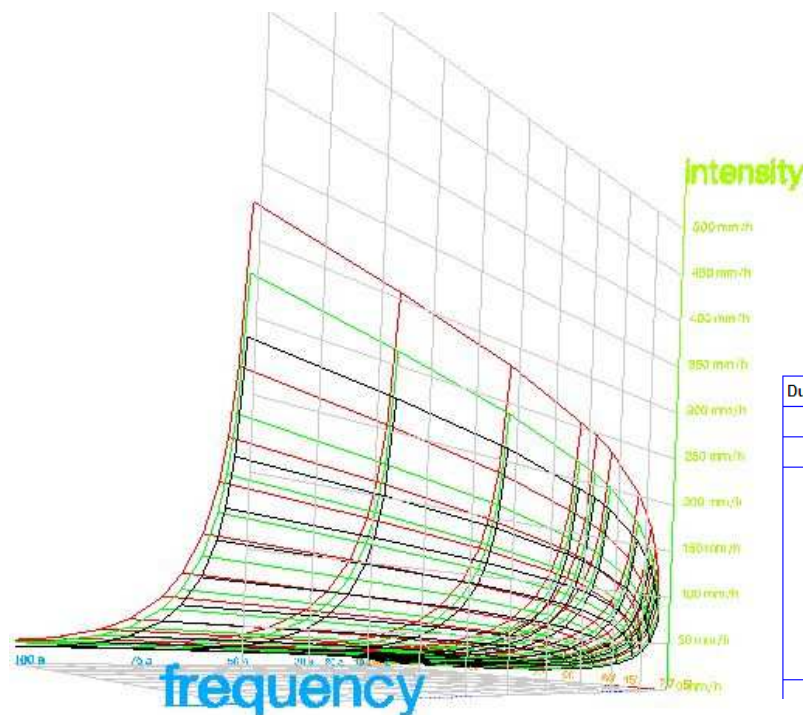
Duration (Minutes)	Scenario	Frequencies (Years)										
		1	2	3	5	10	20	25	30	50	75	100
		Intensities (mm/h)										
5	historic, 1995	75.60	100.8	114.0	133.2	157.2	182.4	190.8	195.6	214.8	229.2	240.0
	echam5a21, 2070	83.70	111.7	126.4	147.9	175.1	204.4	214.5	220.6	245.2	265.5	282.2
	minimum	83.70	111.7	126.4	147.9	175.1	204.4	214.5	220.6	245.2	265.5	282.2
	maximum	98.60	131.5	148.8	174.0	205.9	240.2	251.9	258.9	287.3	310.5	329.2
	ccsm3a1b, 2070	85.10	113.6	128.6	150.7	179.1	210.6	221.8	228.9	258.0	284.1	306.8
	echam5a1b3, 2070	93.60	124.8	141.1	164.8	194.4	225.1	235.2	240.9	263.4	279.7	291.3
	hadleya1b, 2070	98.60	131.5	148.8	174.0	205.9	240.2	251.9	258.9	287.3	310.5	329.2
10	historic, 1995	50.40	66.60	76.80	89.40	106.2	123.0	128.4	132.6	145.8	155.4	162.6

4. Download results

- All projection data as well as minimum and maximum values

- CSV, 3 columns or as (Duration x Frequency) grid

- Unit and decimal separator are the same as in your historical data

Projection	csv, 3 columns	csv, frequency as columns
historic, 1995	download	download
echam5a21, 2070	download	download
minimum	download	download
maximum	download	download
ccsm3a1b, 2070	download	download
echam5a1b3, 2070	download	download
hadleya1b, 2070	download	download

Feedback

- In the actual test phase the service is free

- But we ask you for feedback
    - Would you like to use it?
    - What changes / extensions can you imagine?
    - Would you be willing to pay for this service?

- The future of RainPortal depends on feedback

☑ 👍 I see RainPortal as an useful service
☑ 👍 I would like to continue to use this service in the future
☑ 👍 I would be willing to pay for such a service
☑ 👍 I request some changes (see below)
☐ 👎 I do not think RainPortal is useful

- Try it yourself:
  http://sudplan.ait.ac.at/RainPortal

SUDPLAN Project Partners

- **Swedish Meteorological and Hydrological Institute**

- **Austrian Institute of Technology**

- **cismet GmbH**

- **Czech Environmental Information Agency**

- **Apertum IT AB**

- **Deutsches Forschungszentrum für Künstliche Intelligenz**

- **Stockholm Uppsala Air Quality Management Association**

- **City of Wuppertal**

- **Technische Universität Graz**

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your ingenious partner

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http://sudplan.ait.ac.at/RainPortal