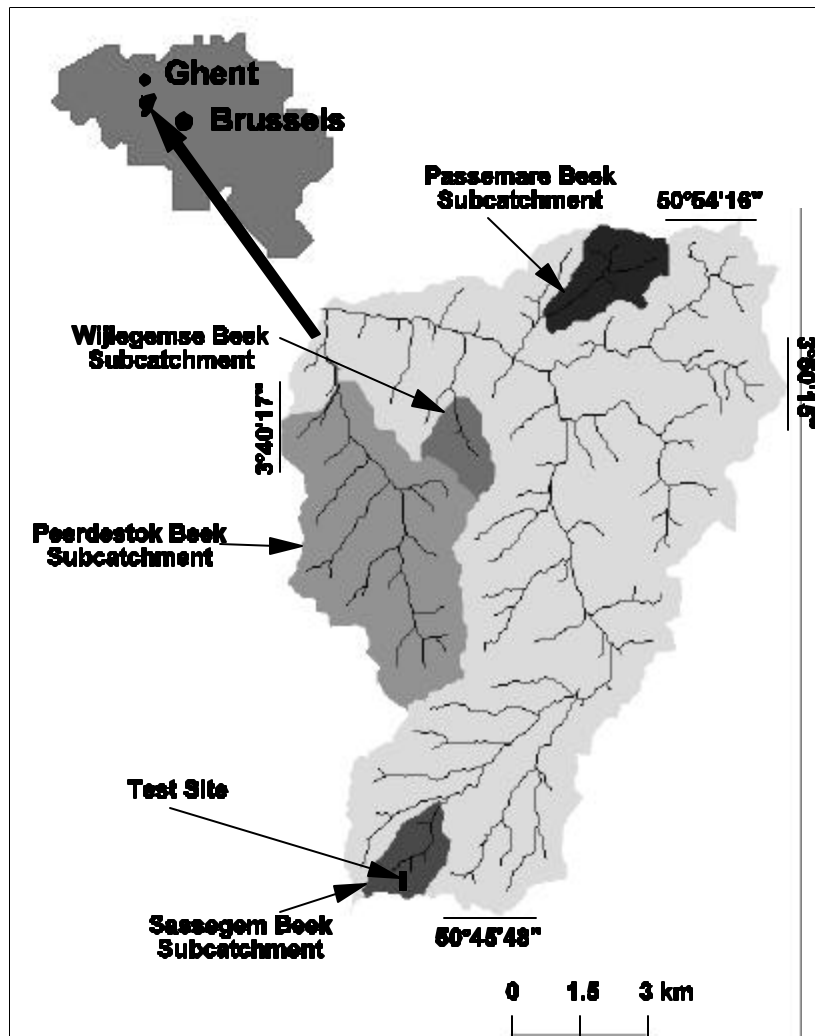


## CEOP HYDROLOGY REFERENCE SITES: Zwalm River, Belgium (Drainage area ~114 km<sup>2</sup>)

### Site summary:

The Zwalm catchment, a subcatchment of the the Schelde River basin, is situated in the province of East-Flanders, Belgium at approximately 50.84°N and 3.78° E, (see Figure) with the outlet of the basin south of Gent near the village Nederzwalm. The total drainage area is 114 km<sup>2</sup> and the total length of perennial streams is estimated from topographic maps, scale 1:10000, to be 177 km. Therefore, the drainage density is 1.55 km/km<sup>2</sup>, a value characteristic for humid catchments. The topography of the basin is characterized by rolling hills and mild slopes. The maximum elevation difference in the basin is 150 m. The mean slope of first order streams (Strahler order) is 3.8%. The catchment is situated in the sandy-loam area of Flanders. Surface sampling has confirmed that most of the top layer of the soil profile has sandy loam texture, even though the Belgian soilmap surface to consist of deep loam soils (A-texture). The depth of the eolic cover is estimated to range between 0 and 10 m. Most of the land use is agriculture (arable crops and permanent pasture) but in the southern portion of the catchment it is forested (~50% Brakel-bos). The degree of urbanization is about 10% with urbanized areas mainly situated in the Northeast (Zottegem) and Southeast (Brakel).



Within the Zwalm are a number of gauged subcatchments, as shown in the figure. The Passemare Beek is a second order (Horton order) stream with a drainage area of 2.52 km<sup>2</sup>, and a total channel length of 2.97 km. The average slope is around 5% (channel slope 4.8% and hill slope 5.6%). The Sassegem subcatchment, with a drainage area of 2.49 km<sup>2</sup> and a total channel length of 2.92 km, is situated in the extreme south of the Zwalm catchment. With average slopes of 8.5%, it is steeper than the Passemare.

Climatic conditions can be described as humid temperate. The mean annual rainfall is 775 mm and is distributed almost uniformly over the year. The average year temperature is 10 deg. C, with January the coldest month (mean temperature 3 deg. C) and July the warmest month (mean temperature 18 deg. C). The annual evaporation is approximately 450 mm.

### Data Summary:

The monitoring network consists of 10 permanent stations with a variety of measurements occurring at these stations. Their coordinates are given in Table 1, and the measurements described under the various parameters below.

**Table 1**

UTM Zone 31		Lambert 72		Station Code
X	Y	X	Y	
551822.79	5629798.18	105291.23	167443.74	<b>100 Elst</b>
548500.33	5637674.88	102113.85	175383.07	<b>101 Neder</b>
549005.74	5635887.79	102586.30	173586.36	<b>102 Mater</b>
554608.69	5631031.51	108100.34	167625.76	<b>103 Francis</b>
556066.36	5639203.06	109709.33	176771.58	<b>104 Velzeke</b>
551581.75	5634368.04	105134.62	172018.74	<b>105 Blasius</b>
555165.62	5632025.99	108675.73	169610.08	<b>106 Beren</b>
549154.14	5626374.07	102558.91	164067.42	<b>107 Schor</b>
551365.50	5626549.85	104773.85	164203.37	<b>MFopbrakel</b>
553521.60	5637785.97	107137.97	175401.34	<b>MFvelzeke</b>

**Table 2**

Station	Catchment	UTM X	UTM Y	Latitude	Longitude
<b>Nederzwalm</b>	Zwalm	548500.33	5637674.88	50.89	3.69
<b>Mater</b>	Peerdestok	549005.74	5635887.79	50.87	3.70
<b>Opbrakel</b>	Sassegem	551365.50	5626549.95	50.79	3.73
<b>Velzeke</b>	Passemare	553521.60	5637785.97	50.89	3.76
<b>Wijlegem</b>	Wijlegemse	551645.08	5635851.90	50.87	3.73

Drainage area to outlet: 114.3 km<sup>2</sup>

Basin outlet latitude-longitude: 50.88° N, 3.682° E. (Station 101 (Neder) at UTM: 548500.33, 5637674.88)

Stream gauge/water level recorder period of record: The basin is gauged hourly at five locations given in the Table 2.

Precipitation gauges: Rainfall is monitored at five locations using a 0.2 mm tipping bucket gauge with accumulated rainfall recorded every 10 minutes. The stations are (see Table 1): 100 (located in the middle of the catchment), 104 (in the Passemere), 105 (between the Peerdestok and the Zwalm in the northern part), 106 (in the central-eastern part) and 107 (in the southwestern part). Digitized data are available since February 2001.

Water level gages: Groundwater piezometers are located in clusters of three around stations 100, 103, and 105. Measurements are recorded hourly.

Meteorological data: One 10 m weather tower (station 100 Elst) is located in the center of the catchment. Measurements are recorded hourly except for precipitation (10 min), air temperature (1/2 hourly) and relative humidity (1/2 hourly). Variables measured are: air temperature (2 m), relative humidity (2m), wind direction and velocity (2m and 10m), solar irradiance (2m) reflection solar radiation (2m). Digitized data available since February 2001

Turbulent flux measurements: A Bowen ratio station is located inside the Sassegembeek catchment (see figure). Data are available from February 2001 to date with some gaps). The eddy-correlation measurements are taken at the same station from March through June 2002.

Other measurements: TDR-based soil moisture measurements are available at location 100 (Elst). From the Spring of 2004 onwards, the rain gauges and TDR instruments for soil moisture will be installed at four different locations in the catchment. Discharge measurements are available at the outlet in digitized format and four subcatchments until 2000 in digitized format and from 2000 onwards as hardcopy. These will be digitized in the near future.

**Contact:** Valentijn Pauwels (valentijn.pauwels@ugent.be)