

Annex 04: Definition of the Area of Coverage

Area NL23 (WEU, Western Europe) will be covered. This area covers essentially most of Western Europe. Its size is 512*512 pixels, with each pixel covering a 4x4 km area.

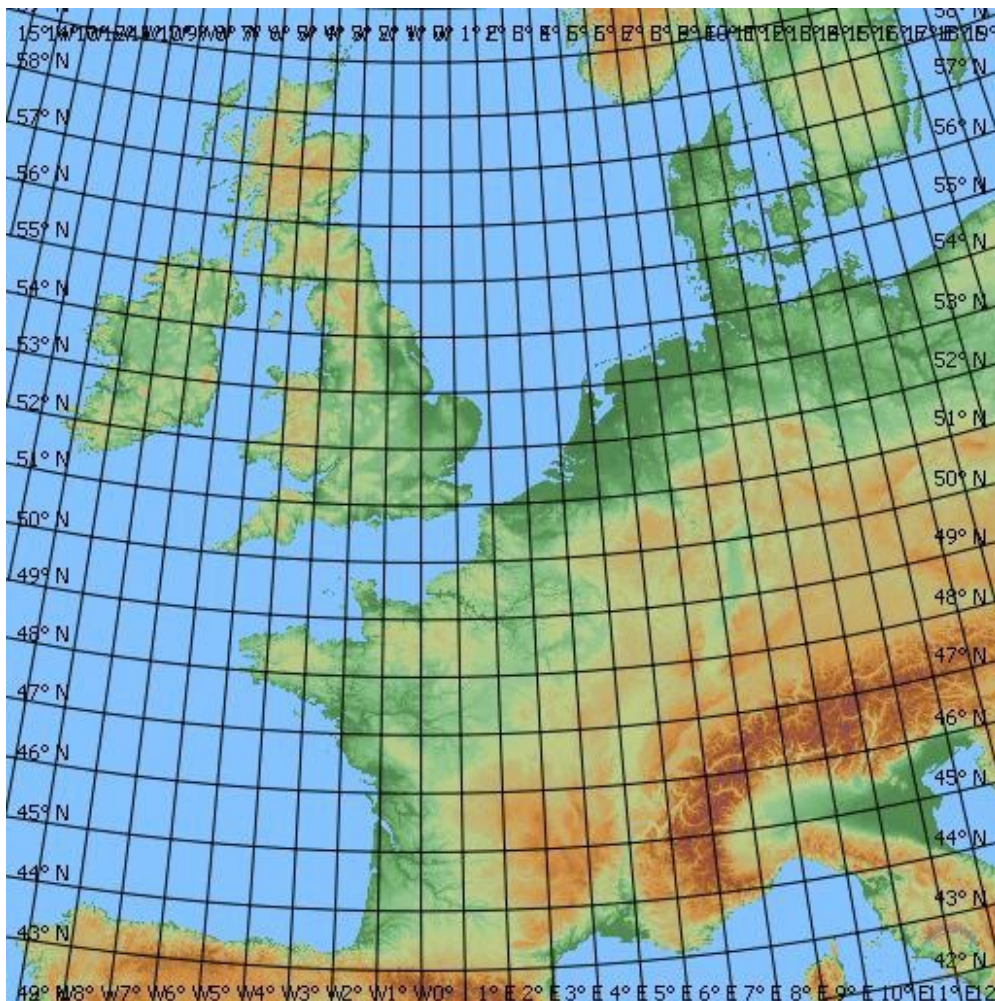


Figure 1 the coverage area NL23

Corner	Longitude	Latitude
Northwest	14W	59N
Southeast	12E	42N

Secondly, area NL25 (Benelux) will be covered. This area covers The Netherlands, Belgium and Luxemburg and some of its surroundings. Its size is 765*700 pixels, with each pixel covering a 1x1 km area.

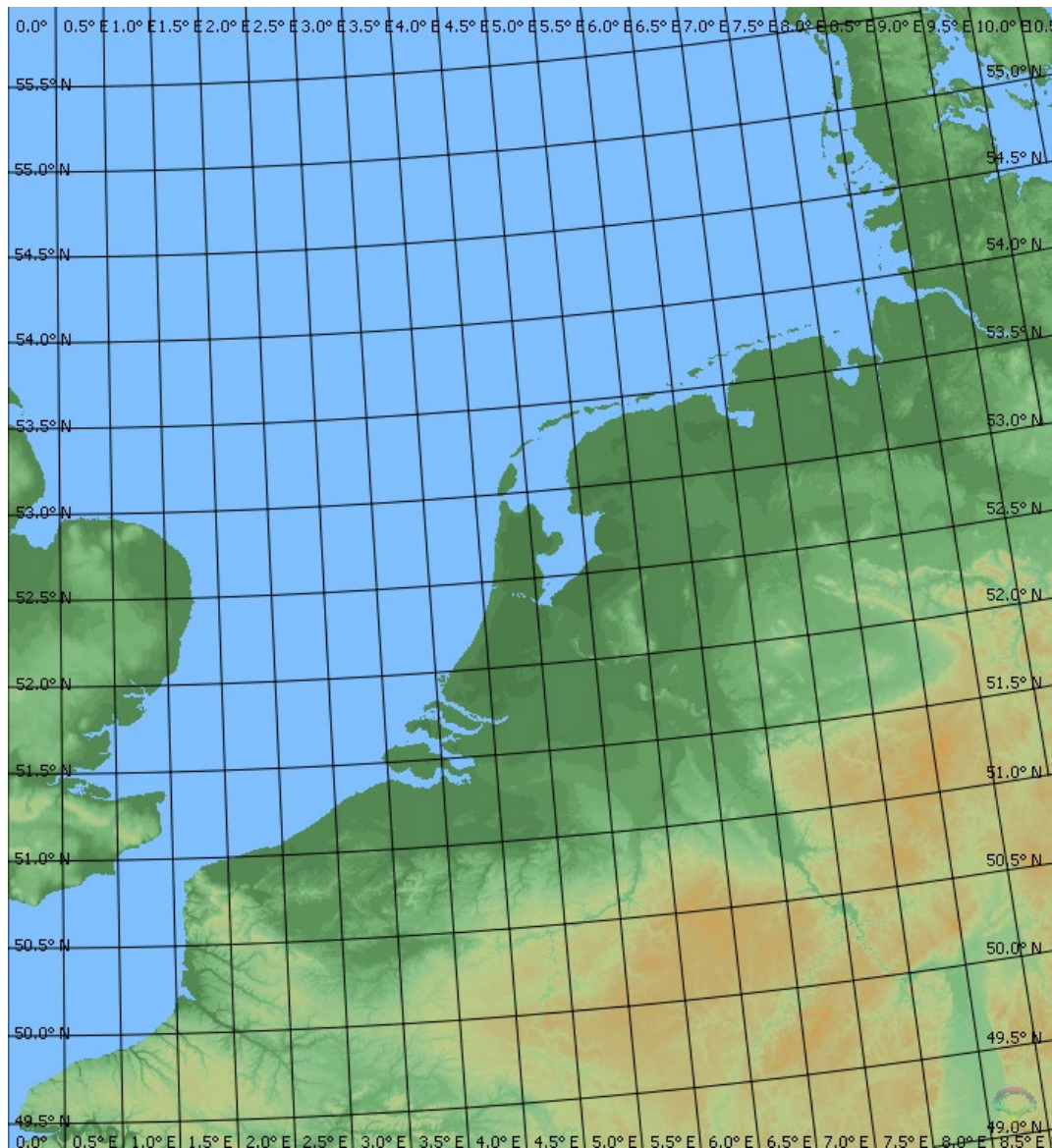


Figure 2: coverage area NL25

Corner	Longitude	Latitude
Northwest	0E	60N
Southeast	9E	49N

Thirdly, area BES will be covered, this area covers a major part of the Caribbean.



Figure 3: coverage area BES, in **grey**. (approximately; coordinates below are binding)

BES:

Corner	Longitude	Latitude
Northwest	71.5W	22.75N
Southeast	45.25W	6.5N

Optionally, the area called BESS will be covered.

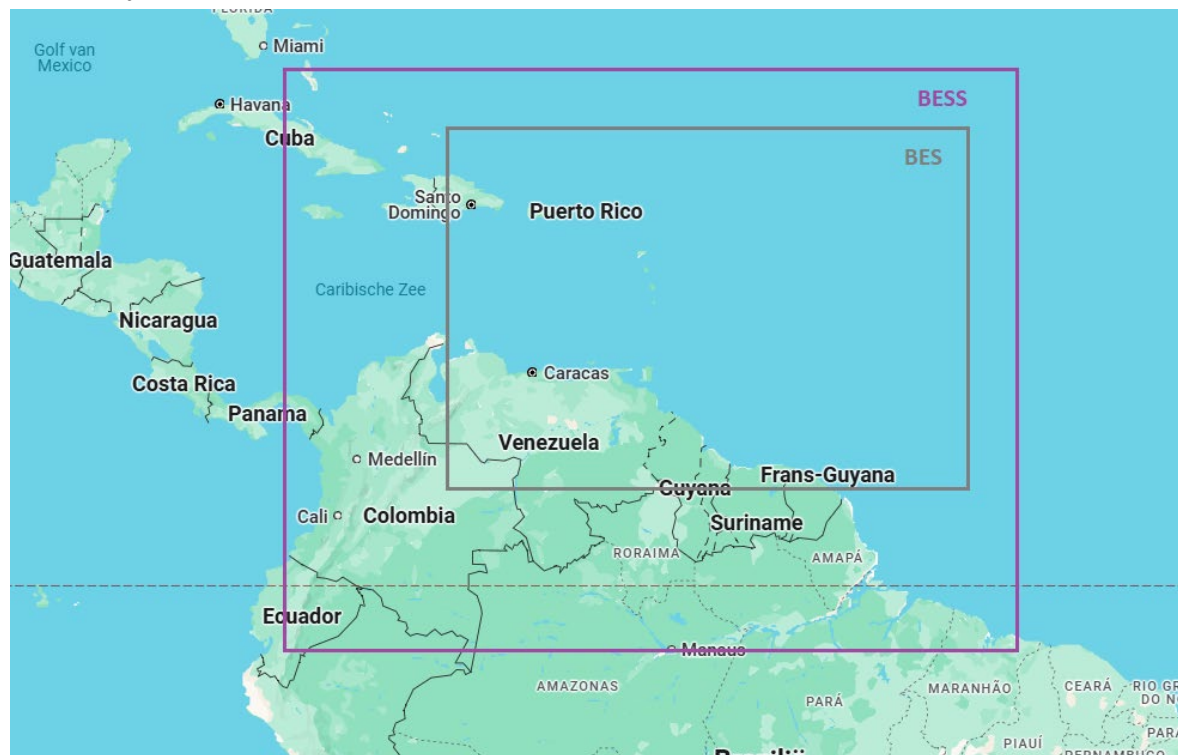


Figure 4, the coverage area of BESS, in **purple**. (approximately; coordinates below are binding)

BESS:

Corner	Longitude	Latitude
Northwest	79.50W	24.45N
Southeast	42.55W	-3.00N

Optionally, enhanced detection efficiency in the North Sea area Amsterdam is required.

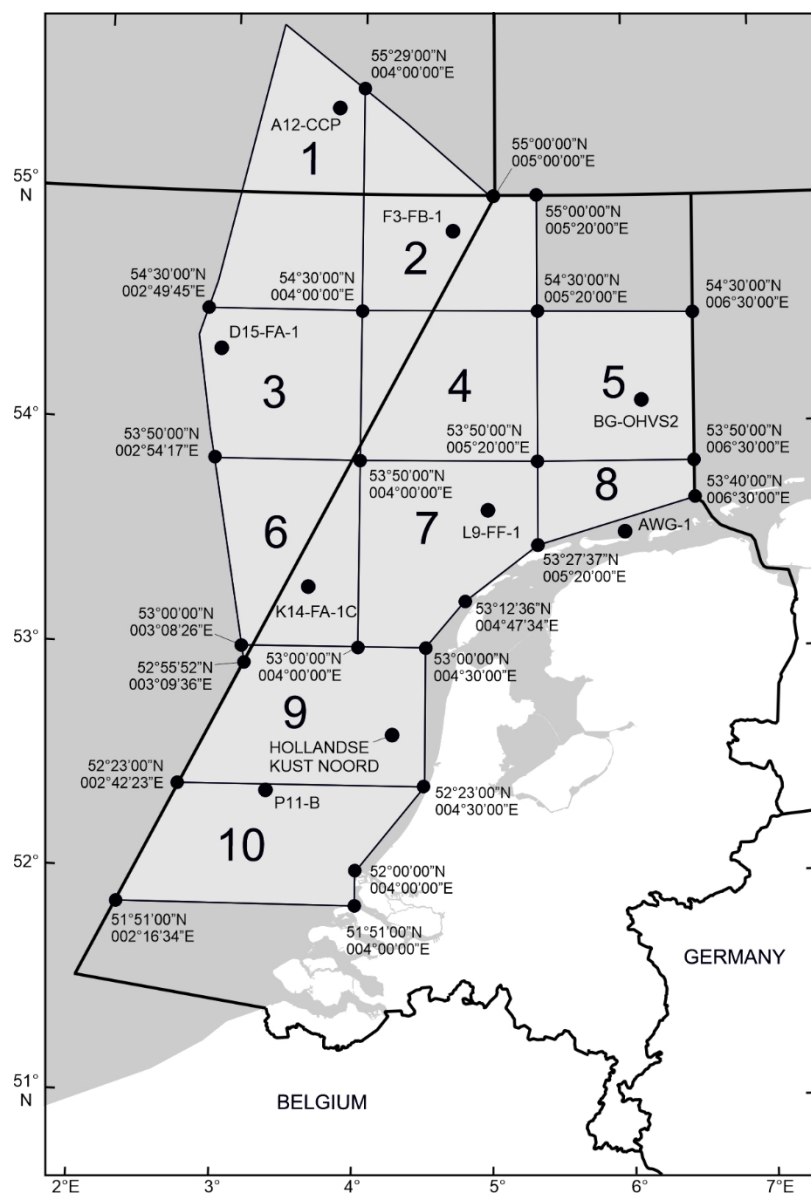


Figure 5: North Sea area Amsterdam

North Sea area Amsterdam consists of the Amsterdam FIR (EHAA) plus North Sea area V, without the part over landmass, but including the area South of Area 10 until the lower border with Belgium in the South.

North Sea Area V consists of (part of) Area 1,2,3,4 and 6 in Figure 5.

Lateral limits:

North Sea area Amsterdam

55°00'00.00"N 005°00'00.00"E;
along parallel to
55°00'00.00"N 006°30'00.00"E;
53°40'00.00"N 006°30'00.00"E;
53°30'00.00"N 005°34'00.00"E;
53°26'24.00"N 005°10'00.00"E;
53°22'29.07"N 004°52'20.47"E;
along anticlockwise arc (radius 8 NM, centre 53°15'00.00"N 004°57'00.00"E) to
53°15'00.00"N 004°43'40.92"E;
along parallel to
53°15'00.00"N 004°37'01.38"E;
along anticlockwise arc (radius 12 NM, centre 53°15'00.00"N 004°57'00.00"E) to
53°11'06.00"N 004°38'07.51"E;
53°09'17.00"N 004°40'28.00"E;
53°06'10.00"N 004°30'56.00"E;
53°05'00.00"N 004°21'00.00"E;
52°48'19.15"N 004°21'00.00"E;
52°45'25.00"N 004°28'03.00"E;
52°43'30.00"N 004°33'40.00"E;
52°43'49.91"N 004°36'45.15"E;
52°31'28.84"N 004°33'57.79"E;
52°25'22.30"N 004°31'28.45"E;
52°16'49.35"N 004°25'35.00"E;
52°12'17.73"N 004°21'31.43"E;
52°08'56.80"N 004°17'31.07"E;
51°59'40.04"N 004°04'25.04"E;
52°00'26.39"N 004°00'34.71"E;
51°49'19.04"N 003°49'57.08"E;
51°44'23.05"N 003°40'35.57"E;
51°35'50.00"N 003°28'43.68"E;
along parallel to
51°35'50.00"N 003°13'49.65"E;
51°23'55.58"N 003°06'00.49"E;
51°30'00.00"N 002°00'00.00"E;
to point of origin.

1.1 Projection parameters for image data

For the NL23 (Western Europe; WEU) and the NL25 (BeNeLux) areas we require an image representation of the number of discharges. We require these images to be projected in a specific way. The projections of the images are specified below.

1.1.1. Projection parameters NL23:

The parameters of the KNMI lightning image are listed in the table below. Using the above-mentioned equations and these parameters, a geographical longitude and latitude can be assigned to each pixel or vice versa.

Parameter	Value
Projection	Stereographic
Origin of projection	L0=0.0E and B0=90.0N
Latitude of true scale	Bw=60.0N
Radius on equator and pole	Re=6378.137 km and Rp=6356.752 km
Offset of left-upper corner	OI=-213.99692 and OJ=799.05
Pixel size	PX=4 km and PY=-4 km
Number of rows and columns	512 and 512

Using these parameters the corners of the lightning images are calculated to be:

Corner	Longitude	Latitude
Northwest	-14.993000E	59.002000N
Northeast	20.453122E	58.089068N
Southwest	-9.270525E	41.937213N
Southeast	12.806000E	41.420000N

1.1.2. Projection parameters NL25:

The parameters of the KNMI lightning image are listed in the table below. Using the above-mentioned equations and these parameters, a geographical longitude and latitude can be assigned to each pixel or vice versa.

Parameter	Value
Projection	Stereographic
Origin of projection	L0=0.0E and B0=90.0N
Latitude of true scale	Bw=60.0N
Radius on equator and pole	Re=6378.137 km and Rp=6356.752 km
Offset of left-upper corner	OI=0 and OJ= 3649.9795
Pixel size	PX=1 km and PY=-1 km
Number of rows and columns	765 and 700

Using these parameters the corners of the lightning images are calculated to be:

Corner	Longitude	Latitude
Northwest	0.000000E	55.973600N
Northeast	10.856454E	55.388971N
Southwest	0.000000E	49.362059N
Southeast	9.009300E	48.895300N

1.1.3. Projection calculations using Proj library:

The projection calculations can also be performed using the "proj" library developed by the USGS and used worldwide in numerous applications. More information on the proj library can be obtained via <https://proj.org>

The projection of the KNMI lightning images is described by the following string in the proj system. This string describes fully the projection when using the proj library:

"`+proj=stere +lat_0=90 +lon_0=0 +lat_ts=60 +a=6378137 +b=6356752 +x_0=0 +y_0=0 +units=km`"