

*Amor 4*

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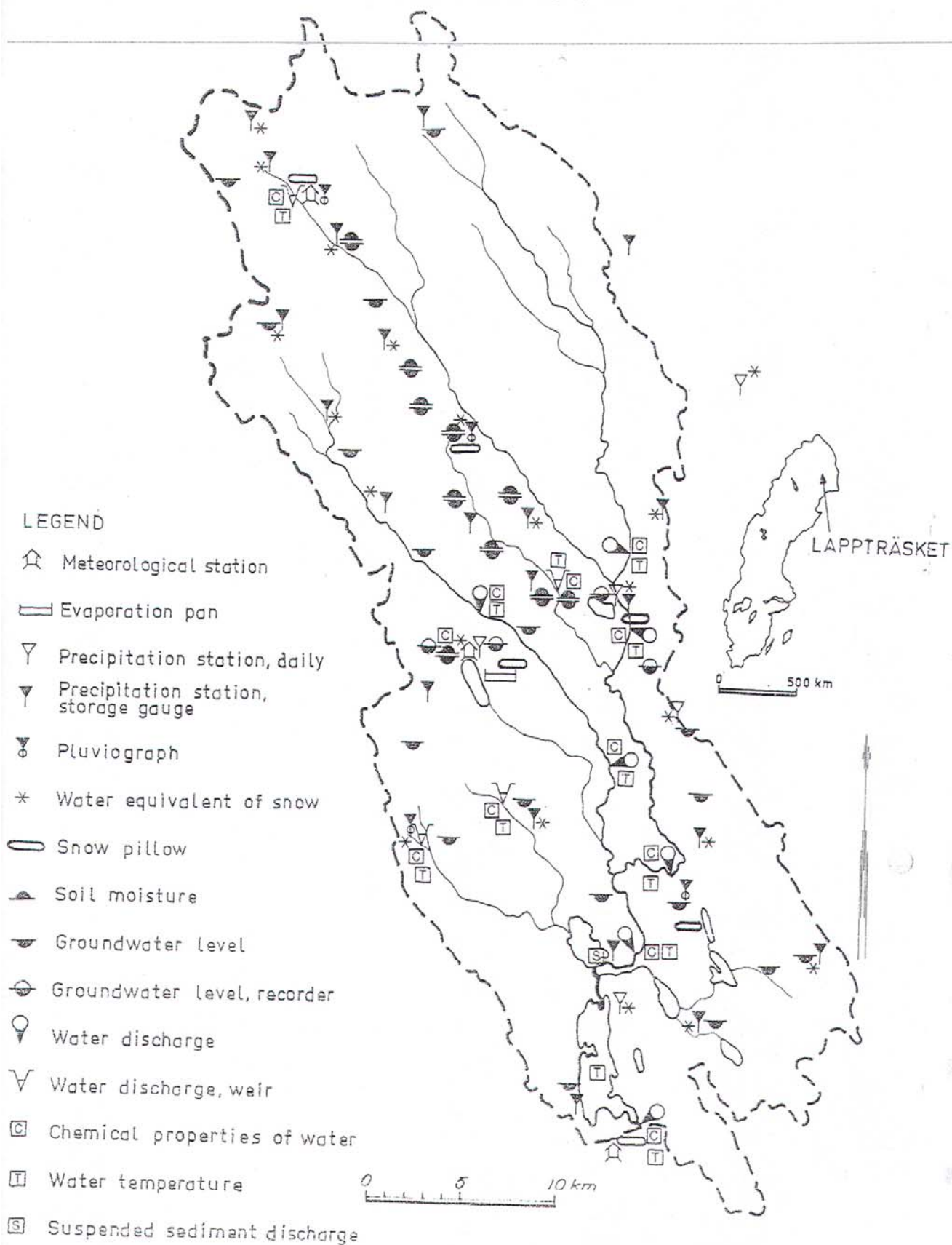
LAPPTRÄSKET  
REPRESENTATIVE  
BASIN

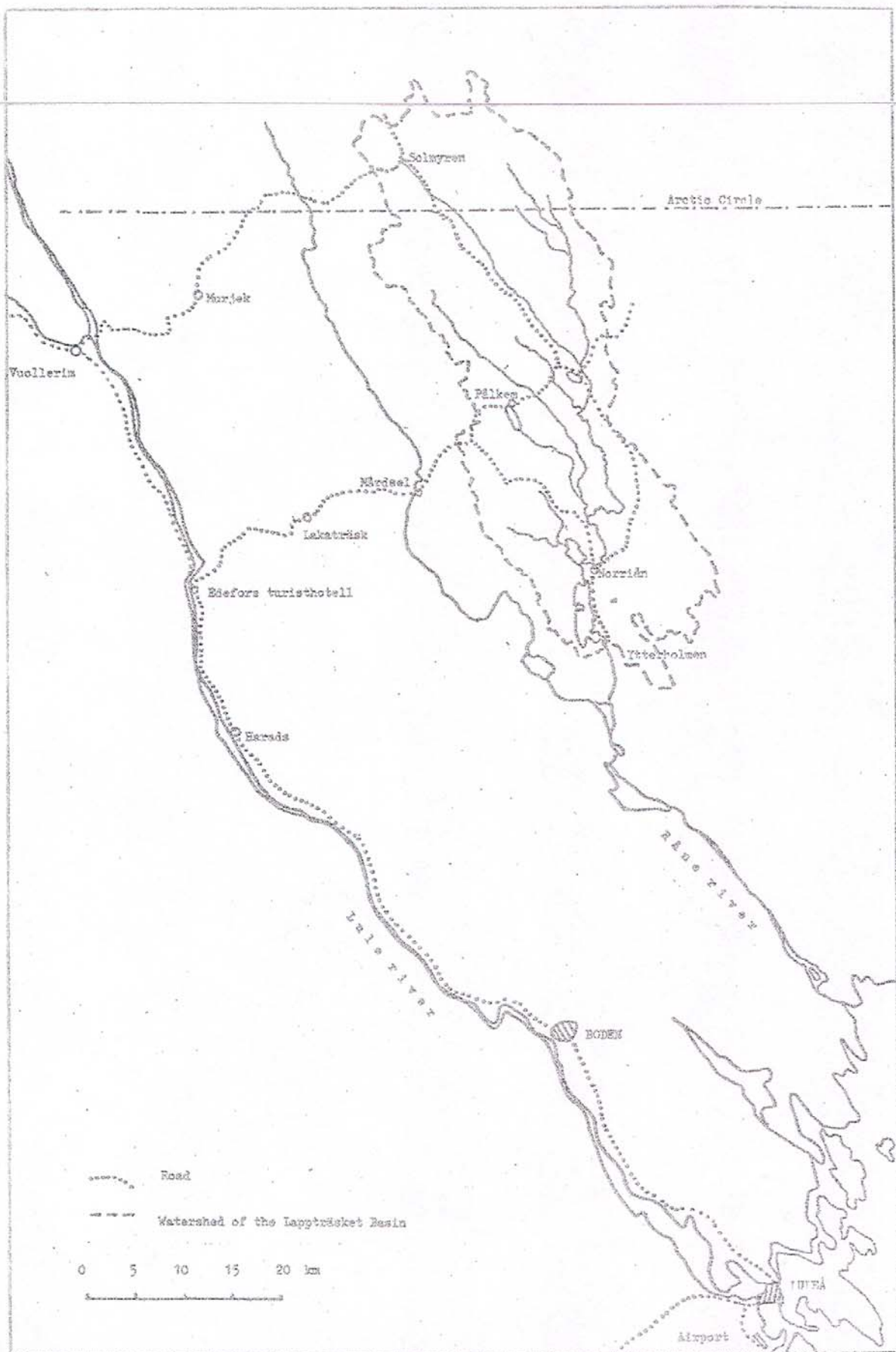
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Sweden

LU 4.2  
 LAPPTRÄSKET REPRESENTATIVE BASIN  
 SWEDEN  
 Station network

274





..... Road  
 - - - - - Watershed of the Lapptösket Basin

0 5 10 15 20 km

## LAPPTRÄSKET REPRESENTATIVE BASIN

1. INTRODUCTION

## 1.1 GENERAL SUMMARY

Country:	Sweden
IHD Project Catalogue No:	2.2054
Research object:	Water budget and hydrological processes
Coordinating agency:	Swedish meteorological and hydrological institute, Stockholm (SMHI)
Agencies cooperating:	Geological Survey of Sweden, University of Stockholm, Institute of Meteorology (SGU, MISU) University of Uppsala, Institute of Geography (UNGI)
Location of basin:	Area: 1004 km <sup>2</sup> Longitude: 21°14' - 22°05'E Latitude: 66°08' - 66°41'N Altitude: 50 - 485 m a. s.l. Median altitude: 265 m Geology: Precambrian bedrock, Moraine Topography: Monadnock plains Vegetation: Coniferous forest Land use: Forest and swamps Climate: Precipitation: 550 mm/year Actual evapotranspiration: 170 mm/year Temperature: (year) + 0,4° C (July) + 14,6° C (Jan.) - 11,4° C
Key publications:	Persson M: Lappträskets representativa område Rapport I Swedish IHD Report No. 15 Persson M: Lappträskets representativa område Rapport II Swedish IHD Report No. 16 Forsman A: Hydrologiska undersökningar i Lappträsket Forskning och framsteg nr 2 1970 Persson M: Representativa området Lappträsket Vannet i Norden nr 4 1969

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## 1.2 REPRESENTATIVITY, CHARACTERISTICS

The basin is mainly situated on the monadnock plain, dominating northern Sweden and Finland and covered with till and bogs and with few rock outcrops. The Arctic Circle passes through the northern part of the area.

The basin is considered representative for the forest and swamp area of northern Sweden with regard to geology and land use.

The streams are not affected by any artificial regulations. There are no factories or mills or other activities which could adversely affect the environment. Though clear cutting of trees do occur in some parts of the basin, no major changes are supposed to be introduced in the foreseeable future.

## 1.3 PURPOSE OF ACTIVITY

The main research objective is to study the water balance and the hydrological processes. For each month the water fluxes and the changes in storage volumes are evaluated including the changes in soil moisture, groundwater and snow cover. Estimates of monthly and annual evaporation are obtained with the water balance method.

Together with the other representative basins the Lapträsket basin will thus serve a key area for determining the distribution of monthly and annual evaporation in Sweden.

Special studies are carried out on the following hydrological processes: areal rainfall and snowfall, infiltration and recharge of groundwater, the runoff process, snowmelt and the water balance of peatlands. Since the snow is dominating the hydrological regime, the snowcover and snow melt are being investigated specially with a view to formulate forecasts of the spring flood.

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## 2 Basin Characteristics

### 2.1 GEOLOGY - GEOMORPHOLOGY

#### 2.11 General description

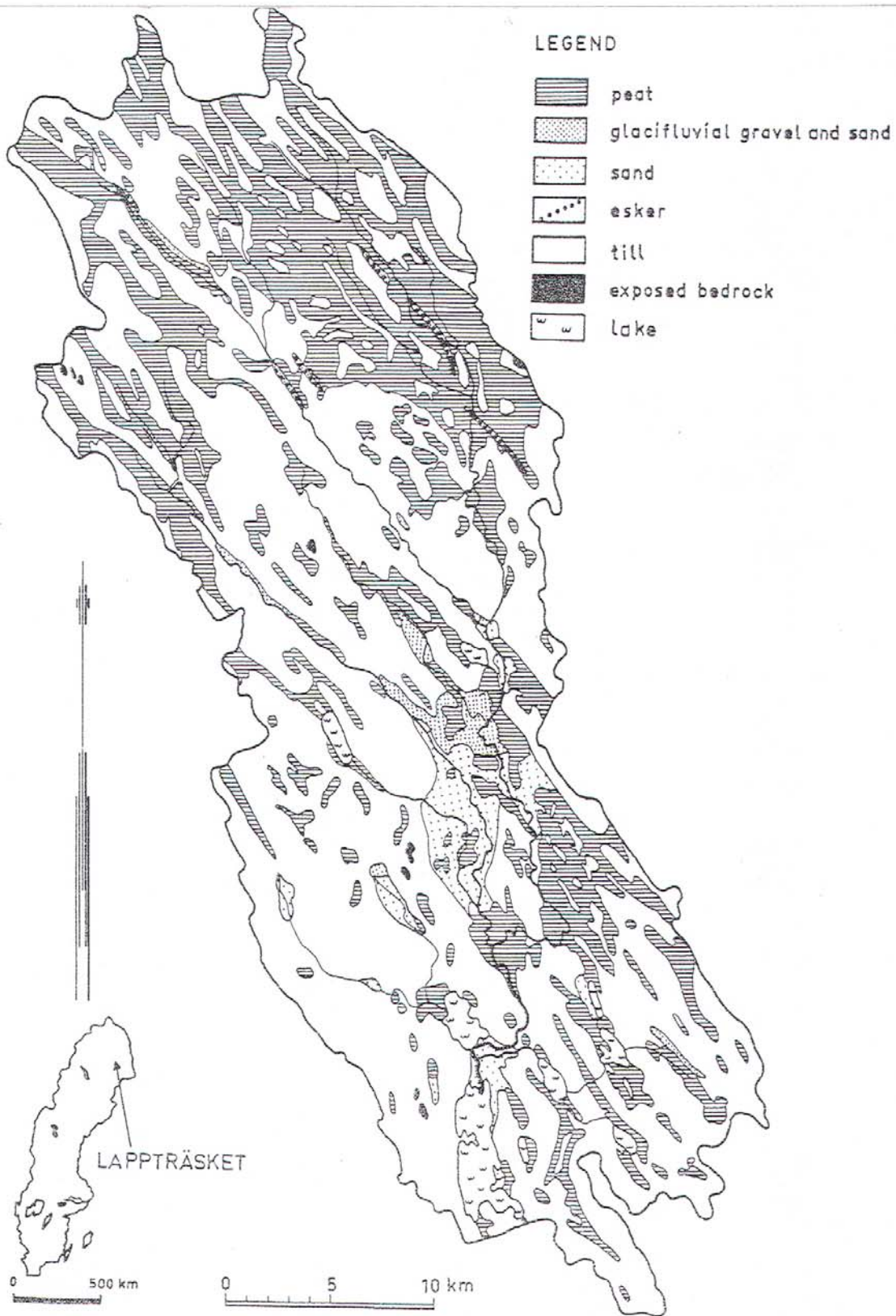
The area is bordered by the surface water divide of the outlet of Lake Lappträsket, where the main discharge station is situated. The water divide crosses several peatlands but has been determined fairly well from aerial photographs. Taking the area and the topography of the basin into consideration the assumption should be a good approximation that the surface and ground water divides coincide.

The characteristic topographical feature is the approximately parallel valleys and ridges running NW - SE.

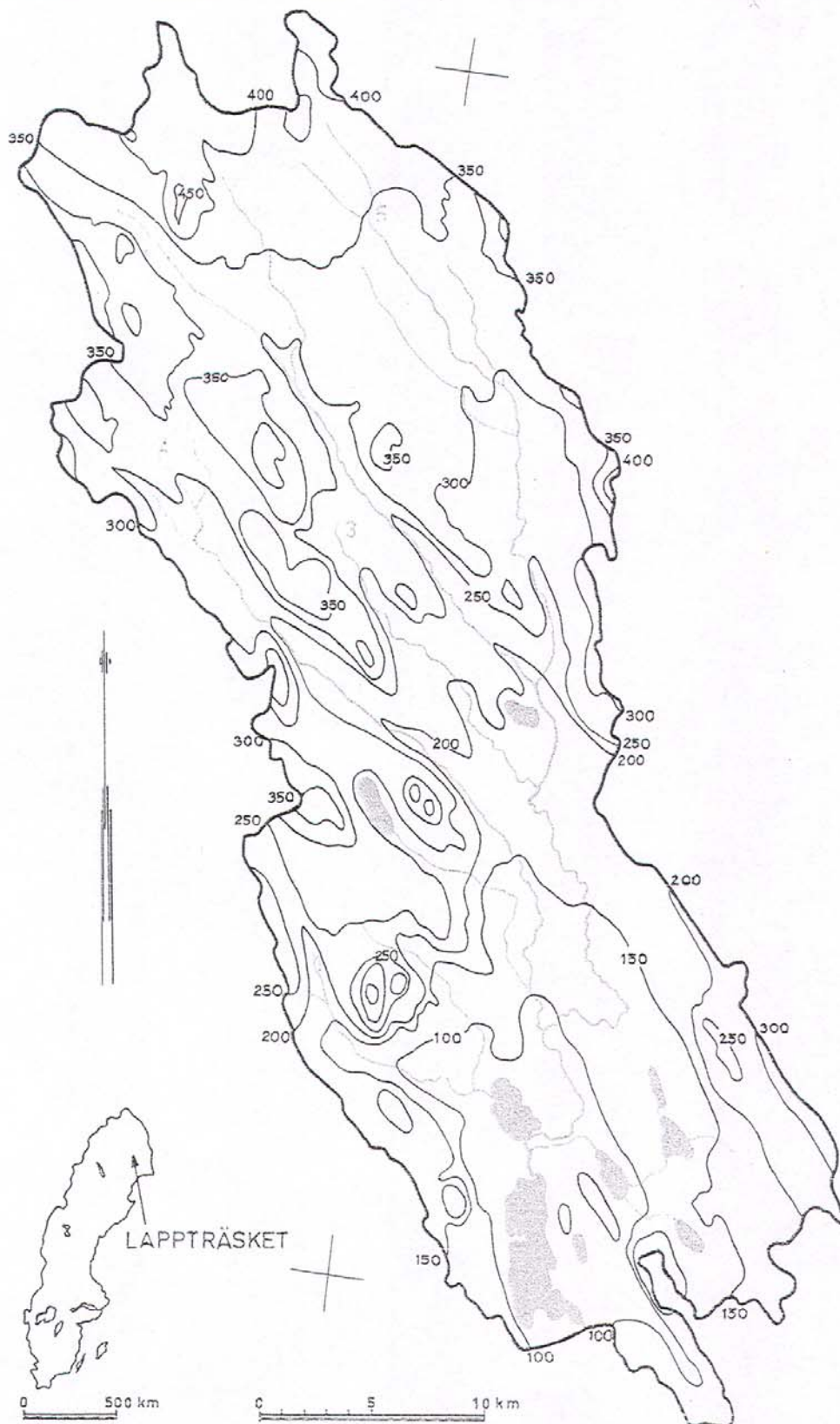
The bedrock is precambrian, mainly Lina Granite and rocks of the Haparanda series. Most of the basin is covered by loose deposits, mainly till, but there are also large peatlands (29% of the area) and some glaci-fluvial deposits. The highest shoreline (about 195 m a. s. l.) crosses the central part of the basin.

The glaci-fluvial deposits in the form of eskers are generally quite small. In the middle part of the area there are some outwash plains. In the southern part which has been beneath the shore line there are some sediments deposited in the Ancylus Lake and Littorina Sea, mostly consisting of sand. Shore features occur in this area.

La 2.12  
LAPPTRÄSKET REPRESENTATIVE BASIN, SWEDEN  
Superficial deposits



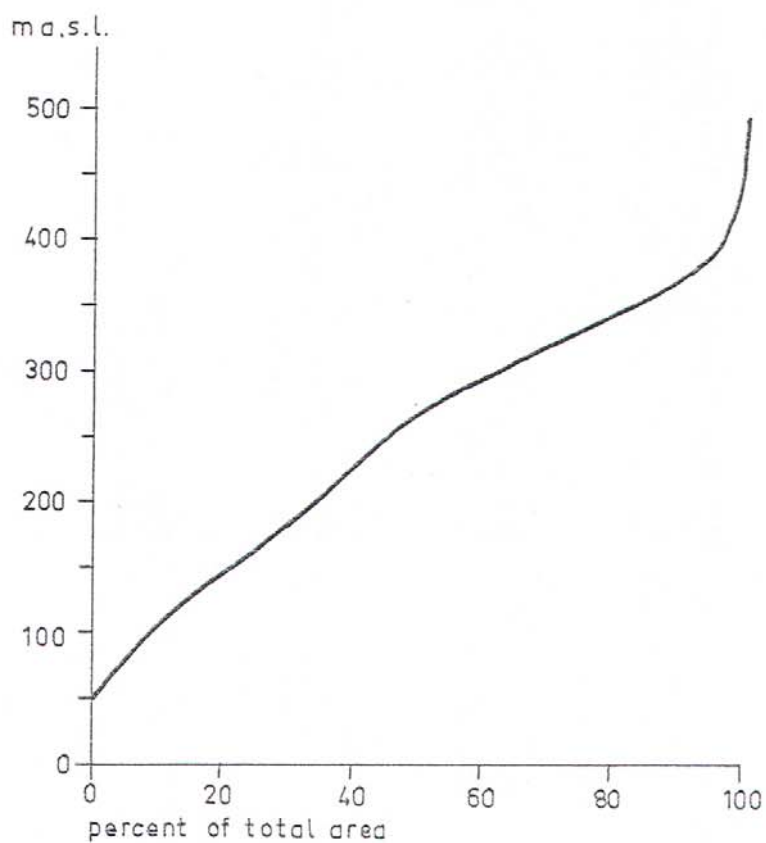
La 2.13  
LAPPTRÄSKET REPRESENTATIVE BASIN  
SWEDEN  
Topography and drainage



La 2.14  
LAPPTRÄSKET REPRESENTATIVE BASIN  
SWEDEN

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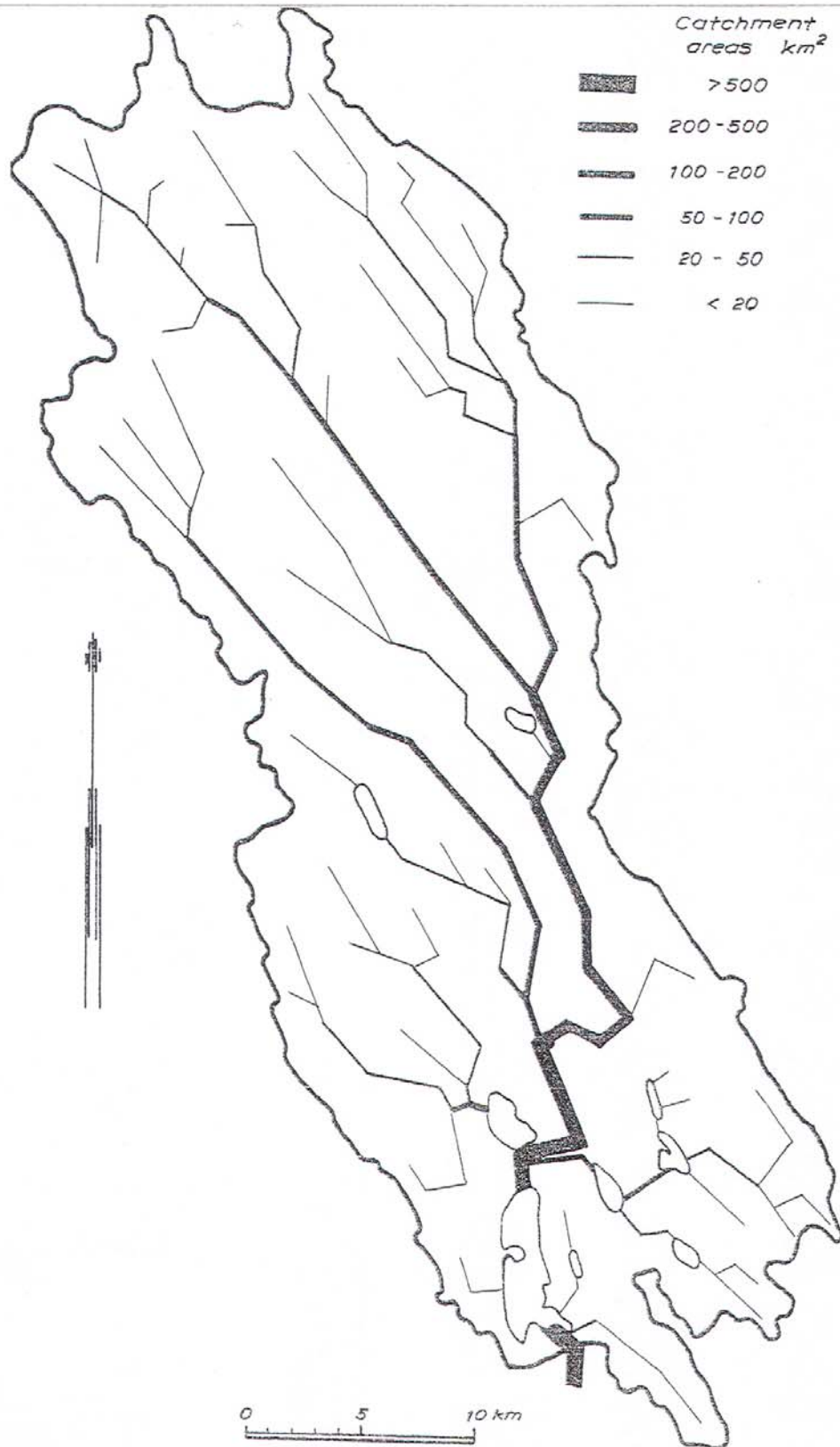
Area - elevation



La 2.16  
LAPPTRÄSKET REPRESENTATIVE BASIN  
SWEDEN

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Distribution of catchment areas



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## 2.2 VEGETATION AND LAND USE

### 2.21 General description

The basin is situated in the boreal coniferous zone and to 67% covered with coniferous forest. The forest is very open, having a very low canopy density, particularly in the northern part.

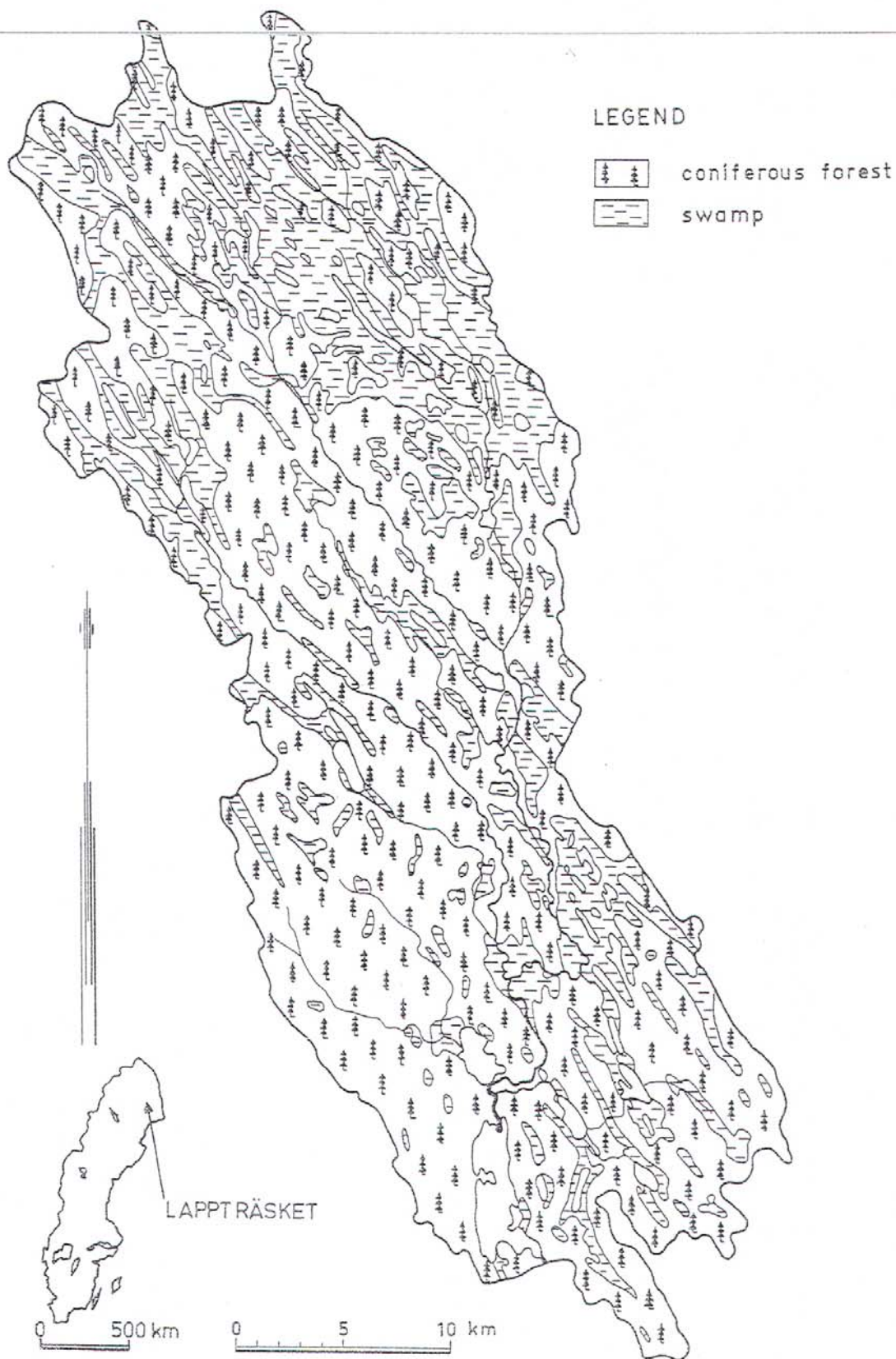
Large areas constitute treeless peatlands, covering altogether about 30% of the area.

Lakes take up 2.6% of the area, the main being lake Lapträsket, the drainage basin of which constitutes the representative basin.

The catchment is almost exclusively used for forestry. The inhabitants were earlier to a limited degree engaged in agriculture and cattle farming, but these activities are now abandoned apart from some reindeer raising. The population is now less than 300 and is decreasing. It is almost completely concentrated to two villages, Pålkem in the middle part and Norriån in the southern part of the catchment area.

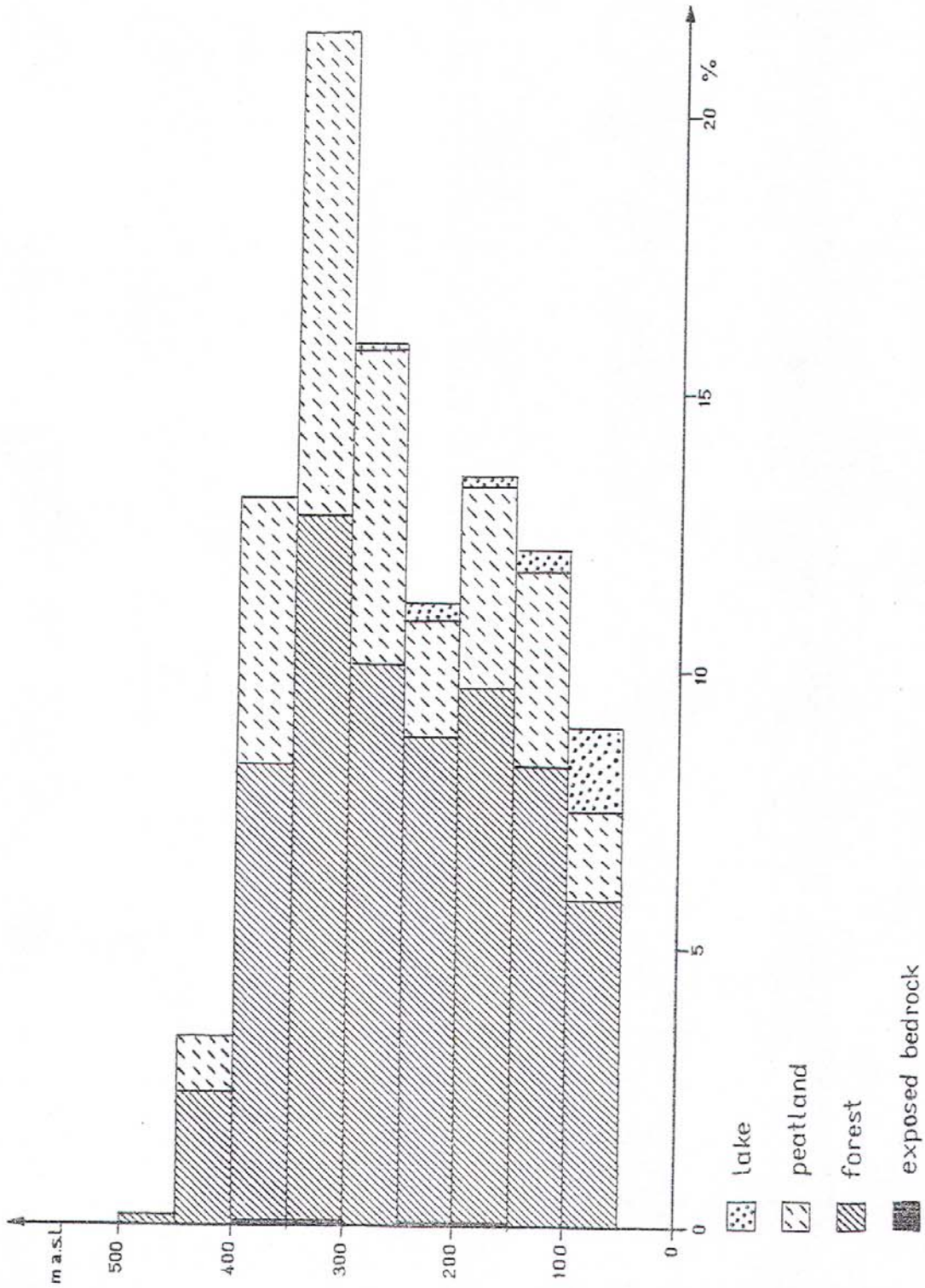
La 2.22  
LAPPTRÄSKET REPRESENTATIVE BASIN, SWEDEN  
Vegetation and land use

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La 2.23  
LAPPTRÄSKET REPRESENTATIVE BASIN  
SWEDEN

Height distribution of land cover



Elevation zone: 50 - 485 m. a. s.l.

LAND USE TYPE	MINERAL SOIL						EXPOSED BEDROCK		SUM sq. km	
	Unstrat. sedim. clay silt % %	sand % %	clay % %	silt % %	sand % %	gravel % %	loose % %	resist. % %		
Lake									2.6	26
River etc.									0.2	2
Treeless peatland									30	301
Treecov. peatland										
Exposed ground							0.4		0.4	4
Heath										
Shrub forest										
Conifer forest	61.3				5.3				66.6	669
Deciduous forest										
Pasture										
Cultivated area										
Garden city area									0.1	1
Town area										
Road, railway etc.									0.1	1
SUM %							0.4		100	
SUM sq. km							4			1004

Map type: Photographic

Scale 1:20 000

### 3. CLIMATE

#### 3.1 GENERAL DESCRIPTION

The local climate is fairly severe with long and cold winters and with snowcovered ground approximately 6 1/2 months every year. The daily mean temperature is below  $-10^{\circ}\text{C}$  70 days a year.

The summer is comparatively warm for this northern latitude. The maximum temperature is above  $+25^{\circ}\text{C}$  10 days a year. The vegetation period begins on May 5 and ends on October 1. The actual annual hours of sunshine are 2100 out of 4580 astronomically possible (45 %).

The day length varies between 24 hours at the summer solstice and 1 1/2 - 2 1/2 hours at the winter solstice. The depth of frost penetration varies very much. Locally it could amount to more than one metre even below an undisturbed snow cover. In the peatlands the frost in the ground could locally persist during almost all summer.

The actual evaporation is approximately 170 mm annually (30 % of precipitation).

#### 3.2 SOME CHARACTERISTICS

(1) Median elevation (above sea level)	265 m
(2) Temperature, annual mean	+ $0.4^{\circ}\text{C}$ (1931-60)
(3) " , warmest month	+ $14.6^{\circ}\text{C}$ (1931-60)
(4) " , coldest month	- $11.4^{\circ}\text{C}$ (1931-60)
(5) Period with mean temperature below $0^{\circ}\text{C}$	Oct. 15 - April 20
(6) " " " " " above $+5^{\circ}\text{C}$	May 15 - Sept. 20
(7) Vapour pressure, warmest month (July)	11 mb (1968-70)
(8) Annual precipitation	550 mm (1931-60)
(9) Driest half-year	Dec. -May (1931-60)
(10) Precipitation for the period (9) (1931-60)	35 % of annual prec.
(11) " " " " (5) (1931-60)	35 % " " "
(12) " " " " (6) (estimation)	45 % " " "
(13) Duration of snow cover	197 days
(14) Period of snow cover	Oct. 25 - May 10

Measured element	Responsible institution	Number of stations or invest. areas	Observation interval and number of stations	Start of observation	Computed element	Storage media	Publication
Precipitation	SMHI } SMHI } SMHI }	30	1 d (5) cont. x) (4) 2/month (30)	1945-68 1969 1968-70		Tables Tables Tables	
Pan evaporation	SMHI	1	1 d x)	1970		Tables	
River water stage	SMHI SMHI	4 7	cont. cont. x)	1923-69 1968-70	River discharge	Tables Magnetic tape	
Water equivalent of snow	SMHI SMHI SMHI	6 24 100	cont. 1/month 1/year	1969-70 1968 1968	Snow melt	Tables Tables Tables	
Soil moisture	SMHI	11	1/month	1968		Magnetic tape	
Ground water level	SMHI, SGU SMHI, SGU SMHI, SGU	3 1 29	cont. x) cont. x) 2/month	1968-69 1971 1968-70		Tables Tables Tables	
Suspended material transp.	UNGI	1	2-8/month	1969		Cards	
Stream water temperature	SMHI	11	1/month x)	1968		Tables	
Lake temperature	SMHI	1	2/week x)	1972		Tables	
Soil temperature	SMHI	3	1-4/month	1969		Tables	
Chemical composition:							
precipitation	MISU	1	1/month	1969		Tables	
stream water	MISU	11	1/month	1969		Tables	
ground water	MISU	30	2/year	1969		Tables	
Air temperature	SMHI	3	cont.	1968-71		Tables	SMHI year- Magnet- book 2.2
Solar radiation	SMHI	1	1 d	1970	Poten- tial evap- oration	Mag- net- ic tape Tables	
Net radiation	SMHI	1	cont.	1970		Tables	
Wind	SMHI	1	1 d	1970		Tables	
Air moisture	SMHI	3	cont.	1968-71		Tables	Tables Magnet- ic tape

x) summer only