WORLD METEOROLOGICAL ORGANIZATION

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

WORKING GROUP ON HYDROLOGY

FIRST SESSION

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STATUS OF OPERATIONAL HYDROLOGICAL ACTIVITIES IN THE REGION NEW CALEDONIA

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* ORSTOM - BP. A5 NOUMEA Cedex - NEW CALEDONIA

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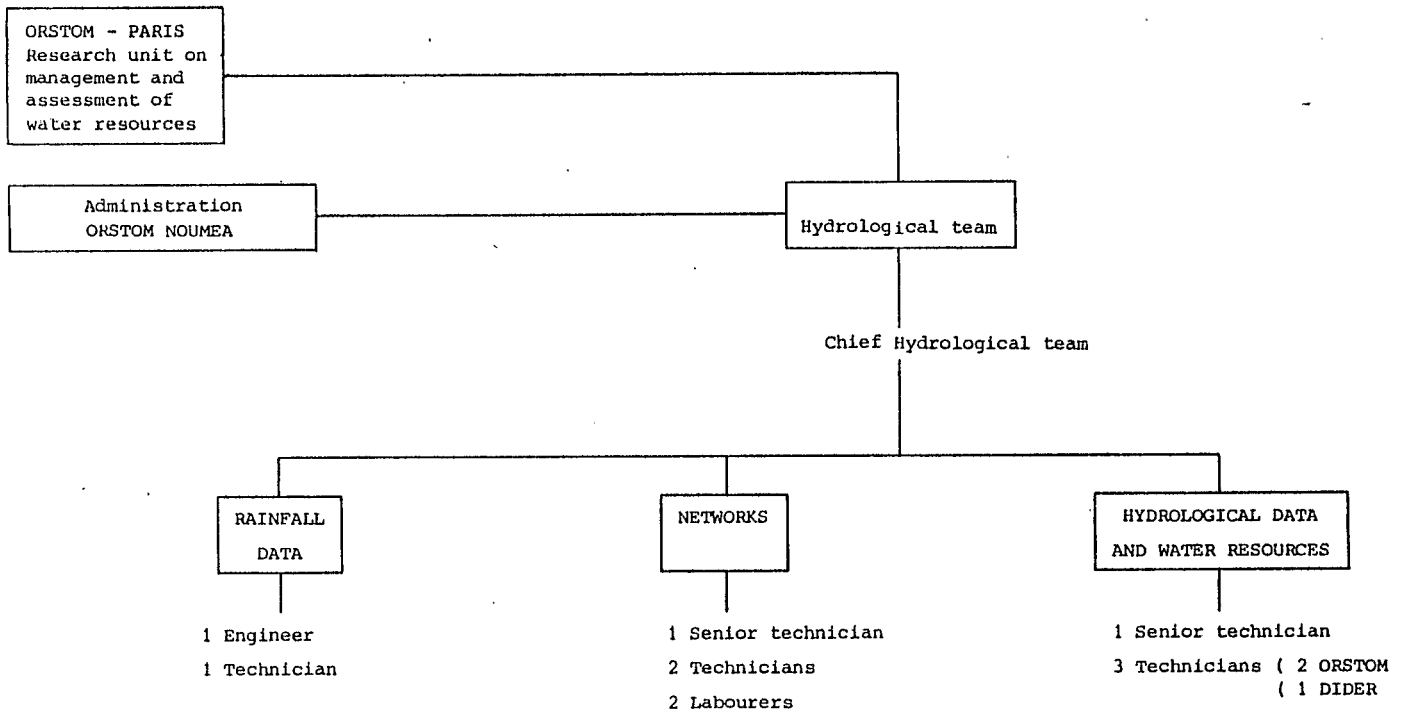
PRESENT ORGANIZATION OF HYDROLOGICAL SERVICE . 1984



3.1 - Rainfall networks

Uniformity in time of observations is generally observed on ordinary raingauge and daily recording gauges. The storage gauges, generally installed in the upper part of controlled drainage basins, are read monthly, seasonally or annually.

Ordinary raingauges : These standard gauges, with a receiving area of 400 cm^2, are particularly used on coastal regions and small islands.

Recording raingauges : In the interior, with problems caused by the lack of habitation and cyclonic rainstorm measuring, ORSTOM has set up daily, weekly, monthly or 3 - monthly recording gauges (Tipping bucklet rain gauge type Siap or Precis Mecanique) in place of standard gauges.

Storage gauges : In mountainous and other remote regions, ORSTOM checks a storage gauges network :

- vertical 30 cm diameter steel pipes of 2 m length without collector.
- large receivers (2, 4 or 8000 mm) with collector (receiving area of 400 cm^2).

3.2 - Evaporation stations

Evaporation is estimated directly by pans type U.S. class A (Meteorological Service) or modified (A = 1 m^2 - V = 0,5 m^3) Colorado (ORSTOM). But these equipments which are read daily when it is possible, are generally installed for some special purpose and a limited number of years (2 - 5 years).

Evaporation network in 1984 :

- 1 evaporation pan type class A (Meteorological Service)
- 8 evaporation pans type Colorado (Hydroagricultural projects on West Coast (ORSTOM + DIDER).

3.3 - Stream-gauging network

3.3.1 .- Measurement of stages

No water levels are observed for only measuring stage (maximum stage gauges are only used for particular purposes : location of high water marks in flood plains, on cross section downstream gauging station controls, ...)

Because of lack of observers and rapidly variations of level (flash floods) almost all of the stations are equipped with water level recorders :

- Float operated recorders OTT (R.20 and X types)
- Bubble gauges NEYRPIC (Telimnip and Lag 2 types)

1984 - NEW CALEDONIA ** - RAINFALL NETWORKS

Type of Region	A = 17000 Km²								Small Islands 2100 Km²	
	Coastal 0-100 m (26 %)				Interior 100-1628 m (74 %)					
Type of gauges	Non- recording		Recording		Non- recording		Recording		Non-recor.	Recor.
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(3)
Meteorological service	39	0	14	0	2	0	5	0	11	5
ORSTOM (+DIDER+ENERCAL)	2	16	2	24	3	63	2	42	0	0
Total	57		40 (41 %)		68		49 (42 %)		11	5 (31%)
Densities ***	45		110		113		286		191	420
Densities *** recommanded by WMO	500 - 800		4000 - 6000		300 - 800		2000 - 6000		25 - 100	300 - 500

(1) Raingauge only

(2) Storage gauge only

(3) Recording raingauge only (or with raingauge)

(4) Recording raingauge with storage gauge

* No organized hydrographic network

** Total area and population in New Caledonia are 19100 km2 and 150 000 persons

*** Densities in square kilometers per station

3.3.2 .- Measurement of discharges

The number of discharge measurements and using methods may be very varied :

- The stability of controls allows to restrict sometimes the number of measurements.
- Measurement methods, depend on velocities and widths, with current meters by wadind, from a boat, from a cable-way or a bridge, and finally with floats.
- Stage discharge relations are defined by current meter measurements and extended on basis of slope-area measurements (computation of roughness coefficient and evaluation of water surface slope).
- On 5 representative basins of the West Coast (equipped for watershed management of this dry region) broad-crested weirs have been established for measurement of discharge.

3.4 - Sediment discharge, chemical quality and water temperature.

For fixed purposes (opencast mining) suspended sediment concentrations have been measured (samplers from the banks, pumping samplers with simultaneous velocity measurement on boat) and analyzed on 3 rivers during 3-7 years but no network (Sediment transport, chemical quality, water temperature) have been set up.

3.5 - Groundwater observation-well network

Several studies on groundwater supplies (small islands, west region) have been carried out by DIDER, but no existing pumped well is incorporated into on observation network.

3.6 - Accuracy of readings

Accuracy required by WMO is very high and too difficult to attain in New Caledonia (gauges, tropical conditions, lack of observers).

Monthly or annual storage gauges are read to the nearest 1 cm.

For water level recorders, charts are read to the nearest 1 cm in dry season for float operated recording gauges but to the nearest 5 cm with bubble gauges.

1984 - NEW CALEDONIA ** STREAM - GAUGING NETWORK

TYPE OF REGION	Windward A = 8300 Km²	Leeward A = 8700 Km²	Small Islands * A = 2100 Km²
Basic network :			
- non recording	0	1	X
- recording	10	12	X
Densities ***	830	670	X
Densities recommanded by WMO	300 - 1500	300 - 1500	X
Secondary Stations : (recording)	1	1	X
Tertiary stations :			
- in 1984 (record.)	8	1	X
- ex-station (non-rec.)	4	1	X
(record.)	2	4	X
Representative basin :			
- in 1984	0	5	X
- ex-repr.basin	2	0	X

X No organized hydrographic network

* * Total area and population in New Caledonia are 19.100 km² and 150.000 persons.

* * * Densities in square kilometers per station

4 - DATA ACQUISITION AND PROCESSING

4.1 - Nature and composition hydrological information and data banks

Hydrological data are collected and stored in two data banks :

- one, operated by Meteorological Service contains data on daily rainfalls,
- the other, controlled by ORSTOM contains primary data, on water levels and discharges at the present time. For each gauging station (rain, river, groundwater) is assigned a unique eight-figure number, including state and basin codes, and data are stored by station number.

4.2 - Rainfall data banks

After checking, daily rainfall totals are entered manually by Climatological section (HP 98.25), or by a private firm (IBM 370). Magnetic tapes or floppy disks are sent to computing Territorial Centre ("SMAI" - IBM 4331) for processing.

60 % of daily rainfall data have been computerized.

4.3 - Discharge data banks

Stage gauge observations, after preparation by ORSTOM, are entered manually by a private firm (IBM 370 computer, floppy disks)

Stage recorder charts are digitized by ORSTOM with a BENSON 601 connected with a microcomputer HP 1000.

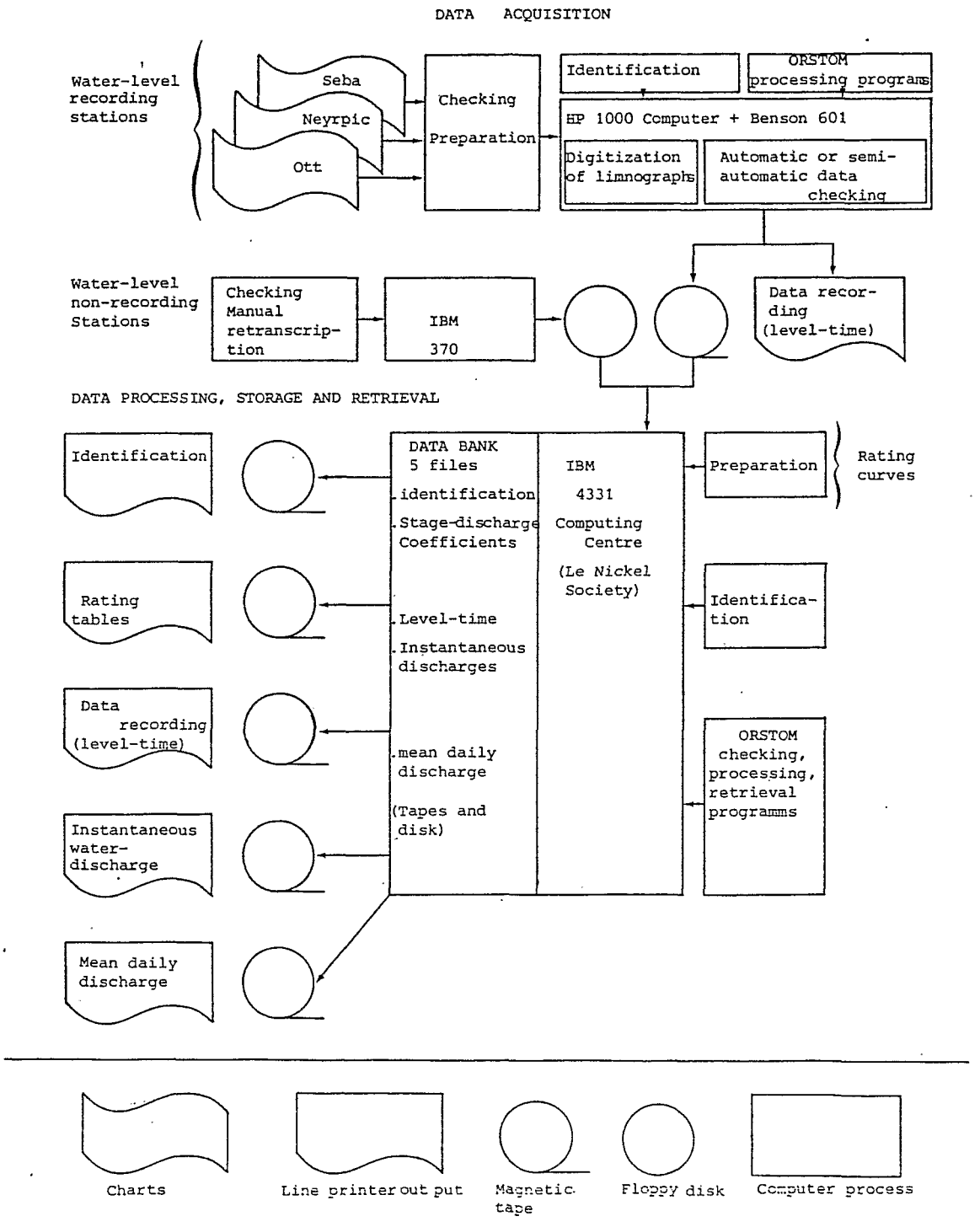
Magnetic tapes and floppy disks are sent to computing Centre of "Société le Nickel", equipped with an IBM 4331 computer, with a network of interactive and batch terminals.

The primary processing of data consists in computing rating tables, and instantaneous, mean daily, monthly and annual discharges.

The bank contains 5 basic files with data of New Caledonia and French Polynesia. In october 1984, there were for New Caledonia 460 station years of water-level data. 75 % of discharges have been computerized.

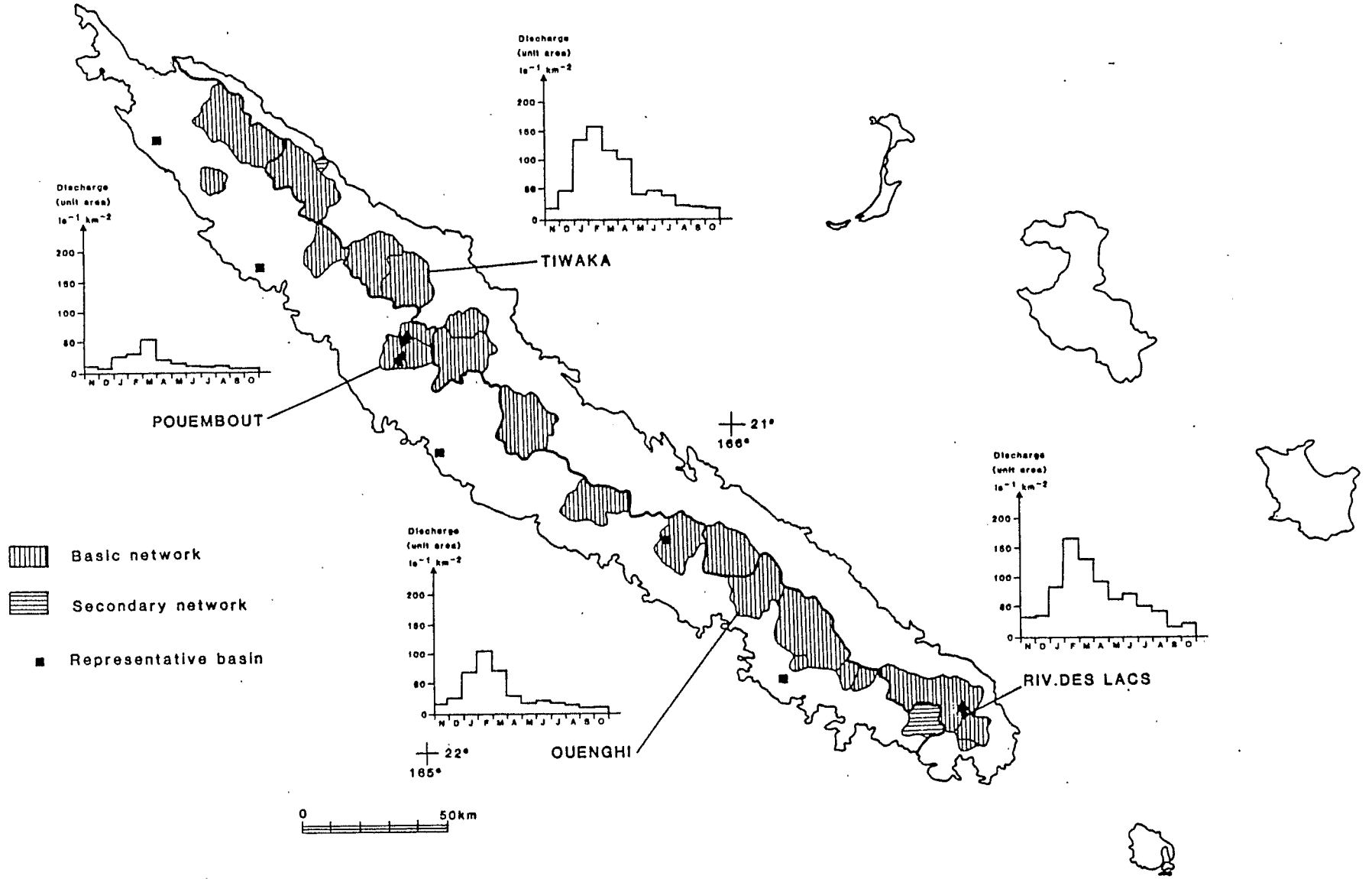
Computer programs (digitization, checking, processing and retrieval) are written by ORSTOM-PARIS and implemented in New Caledonia by Hydrological Service with Computing Centre assistance.

ORSTOM - NOUMEA - HYDROLOGICAL PRIMARY DATA BANK



NEW CALEDONIA

Hydrological networks



5 - NETWORKS DEVELOPMENT

The basic network density is higher than recommanded but it will be difficult to continuous over a long period with actual recorders (maintenance, accuracy, charts, bubble gauge sensors). ORSTOM PARIS is developing long term recorders (rain and water level gauges) which produce and store (static memory directly computer- compatible) records in digital form.

6 - TRANSMISSION SYSTEMS AND HYDROLOGICAL FORECASTS

- Flood forecasts

New long term recorders may be equipped with the Argos system but, in addition to the cost, a delay of some hours does not allow flood forecasts. In New Caledonia, most of the catchment's times of concentration does not exceed 6 hours (flash floods).

- Drought forecasts

Long term forecasts of drought, based on a simple correlation between South Oscillation (Pressure indices) and precipitations is trying.