

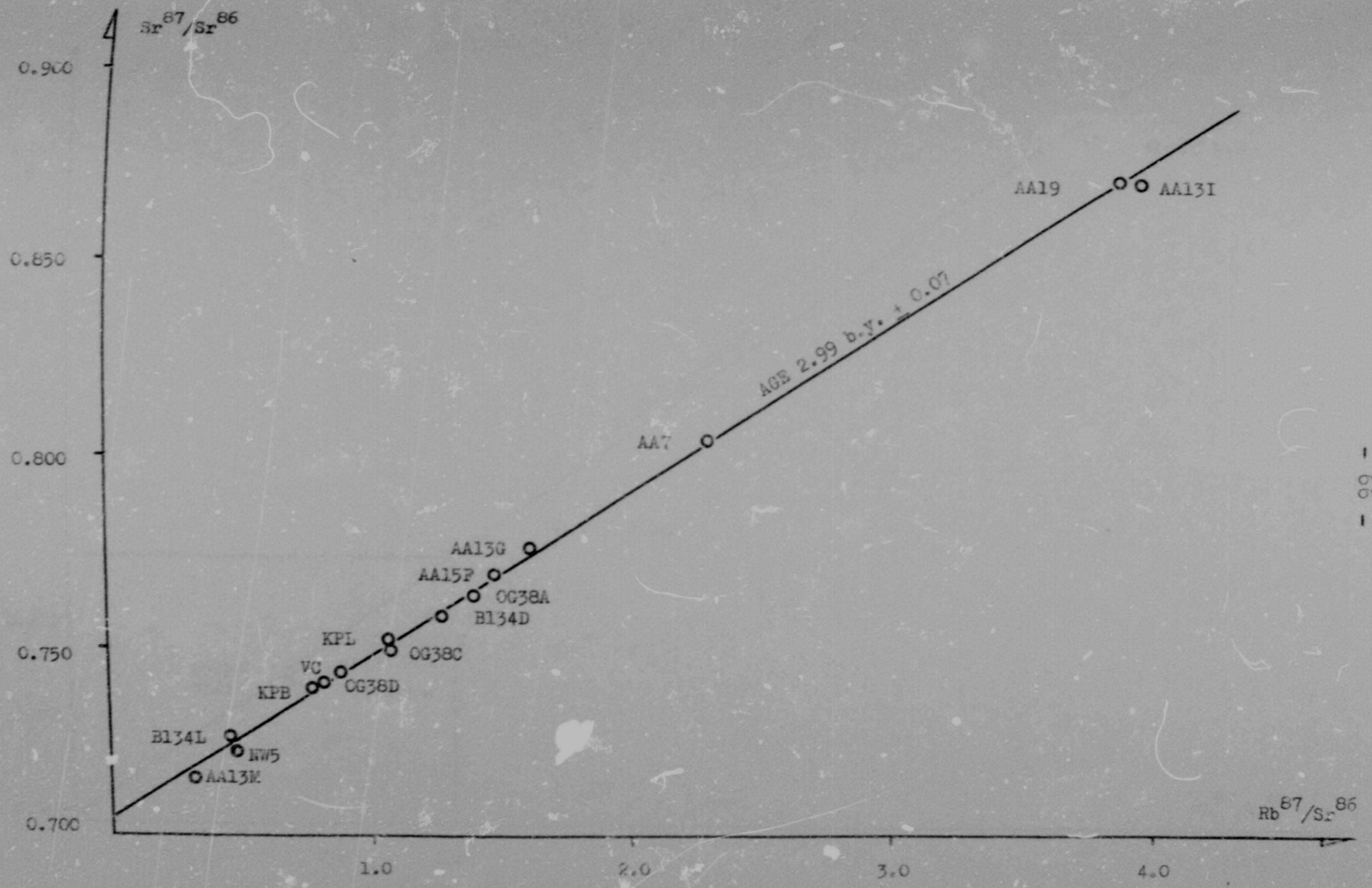
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Rb-sr isotopic studies relating to problems of geochronology on the Nelspruit and Mpageni granites

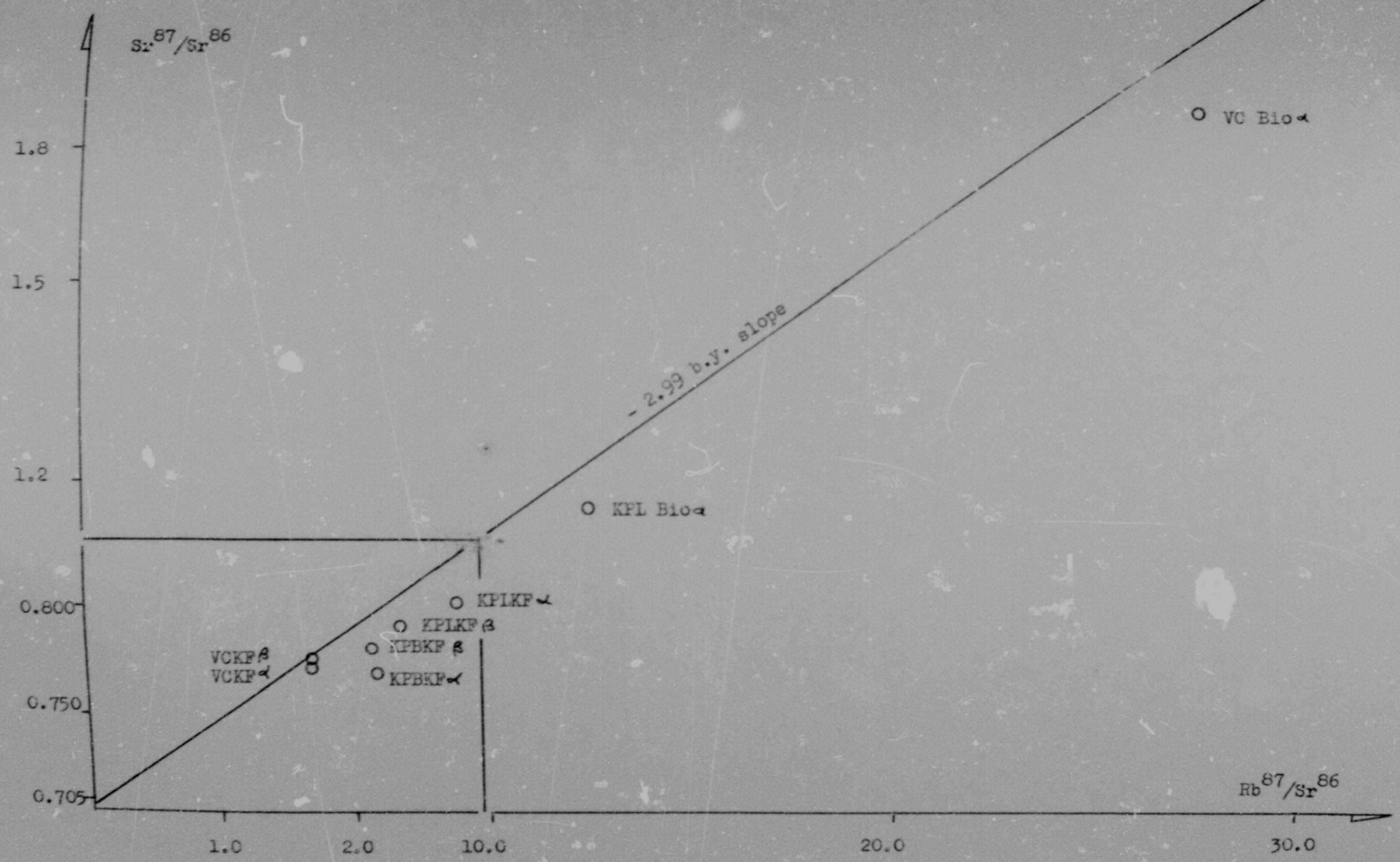
De Gasparis, Aurello Alfonso Amedio

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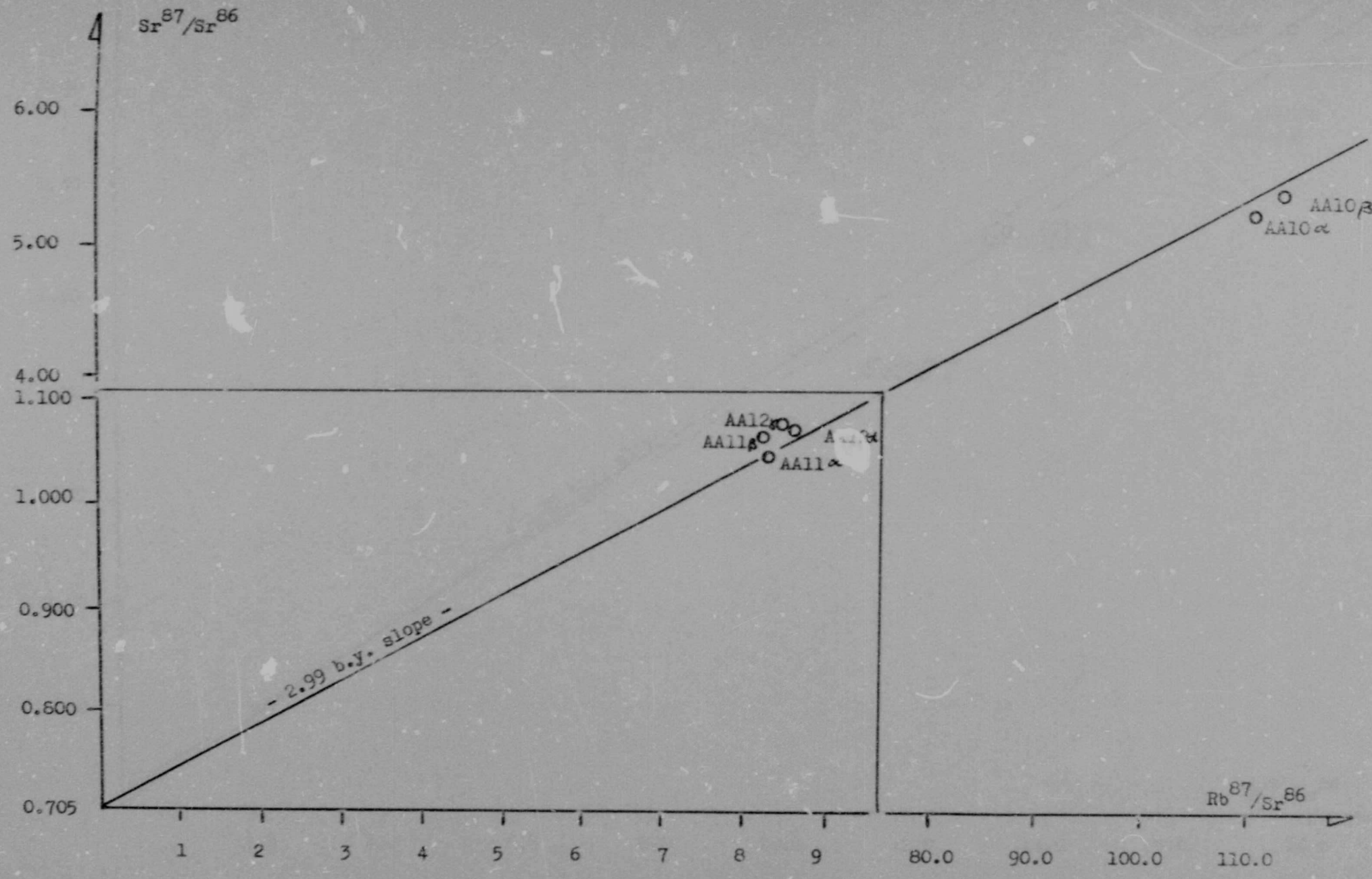
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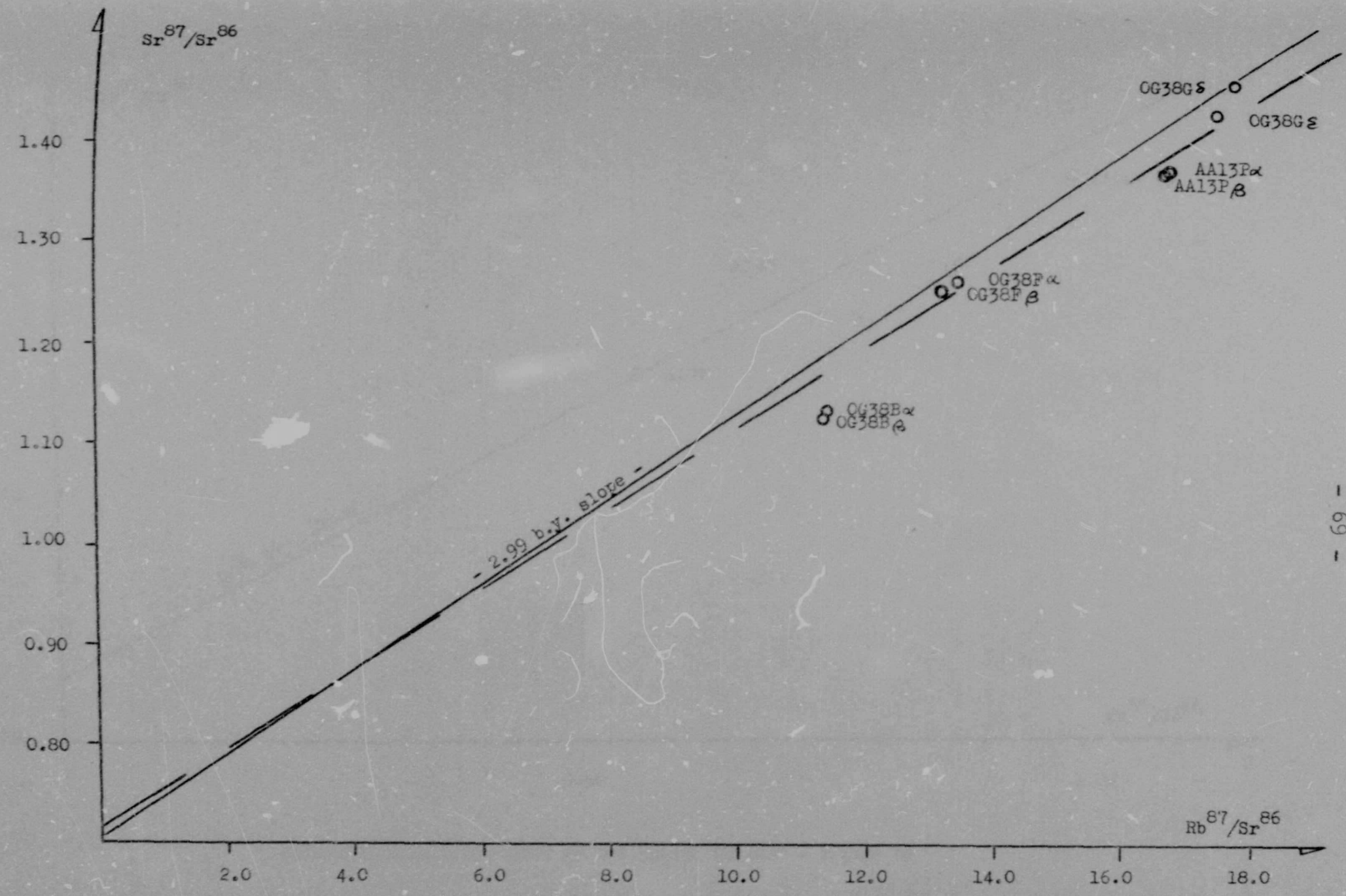
TOTAL ROCKS - NELSPRUIT MIGMATITE ISOCHRON PLOT - Figure 19



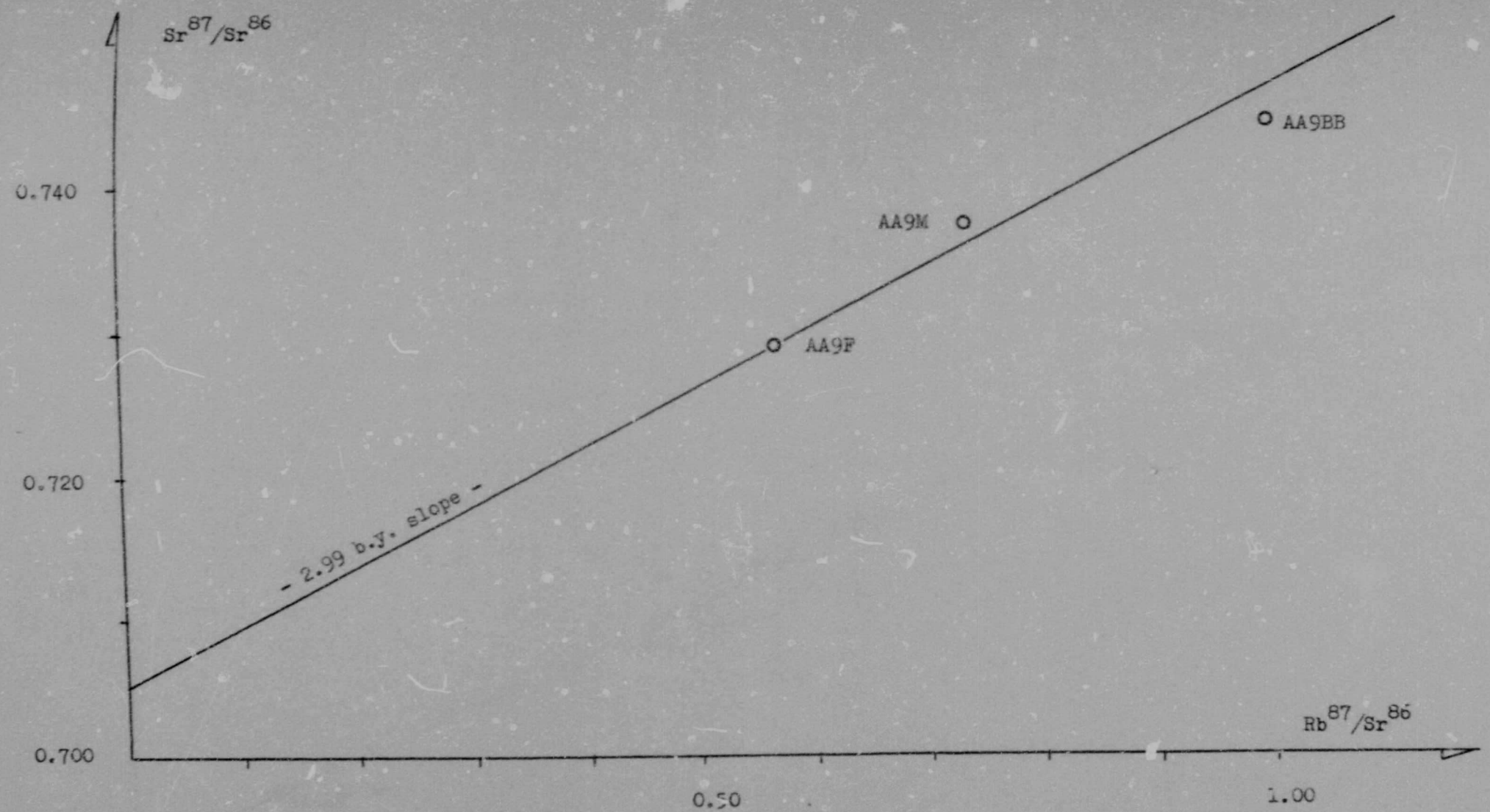
NEISPRUIT MIGMATITE: PLOT OF THE SEPARATED MINERALS DATA - Figure 13



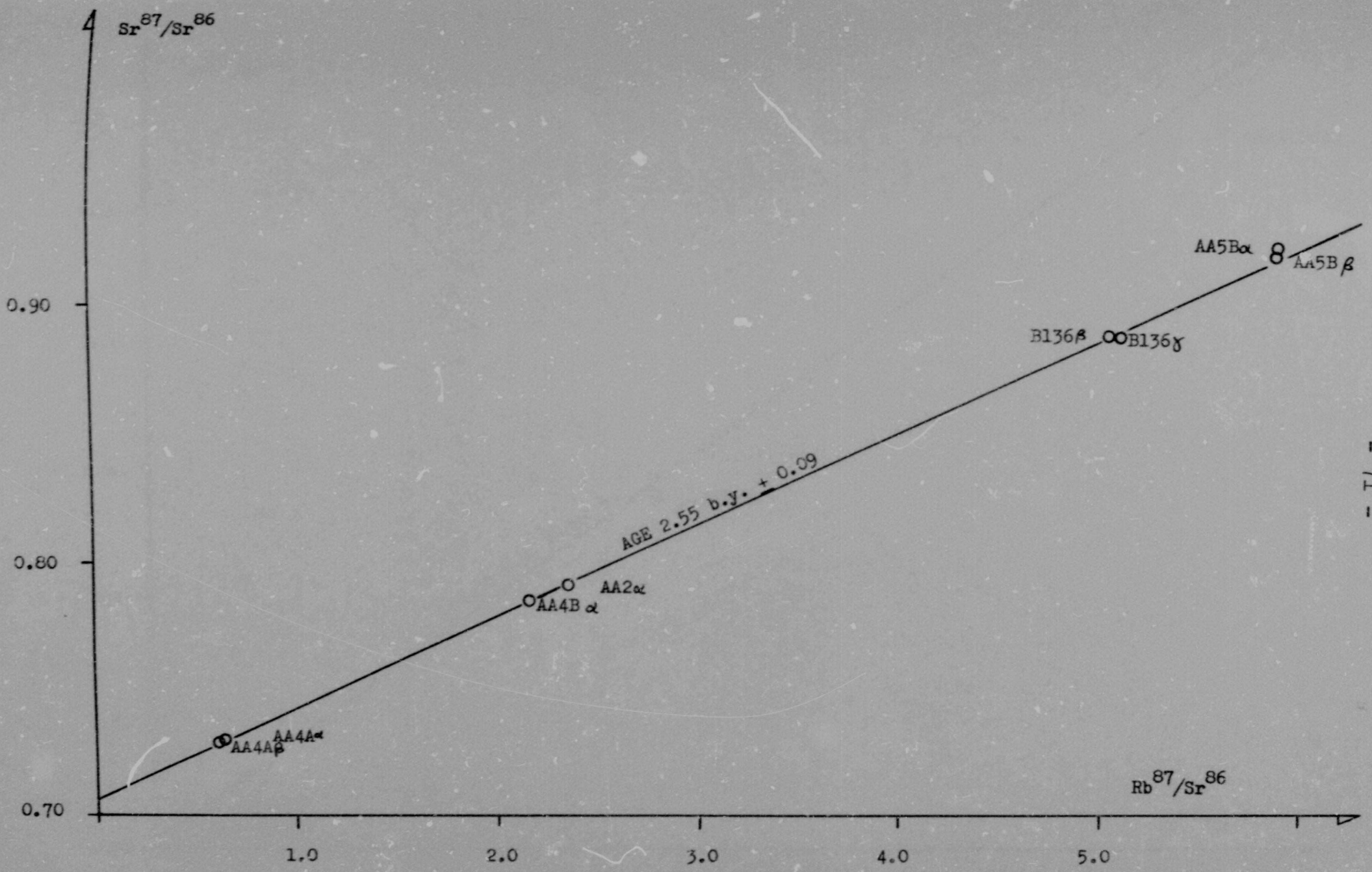
NELSPRUIT MIGMATITE: PLOT OF THE CONTACT PHASE DATA - Figure 14



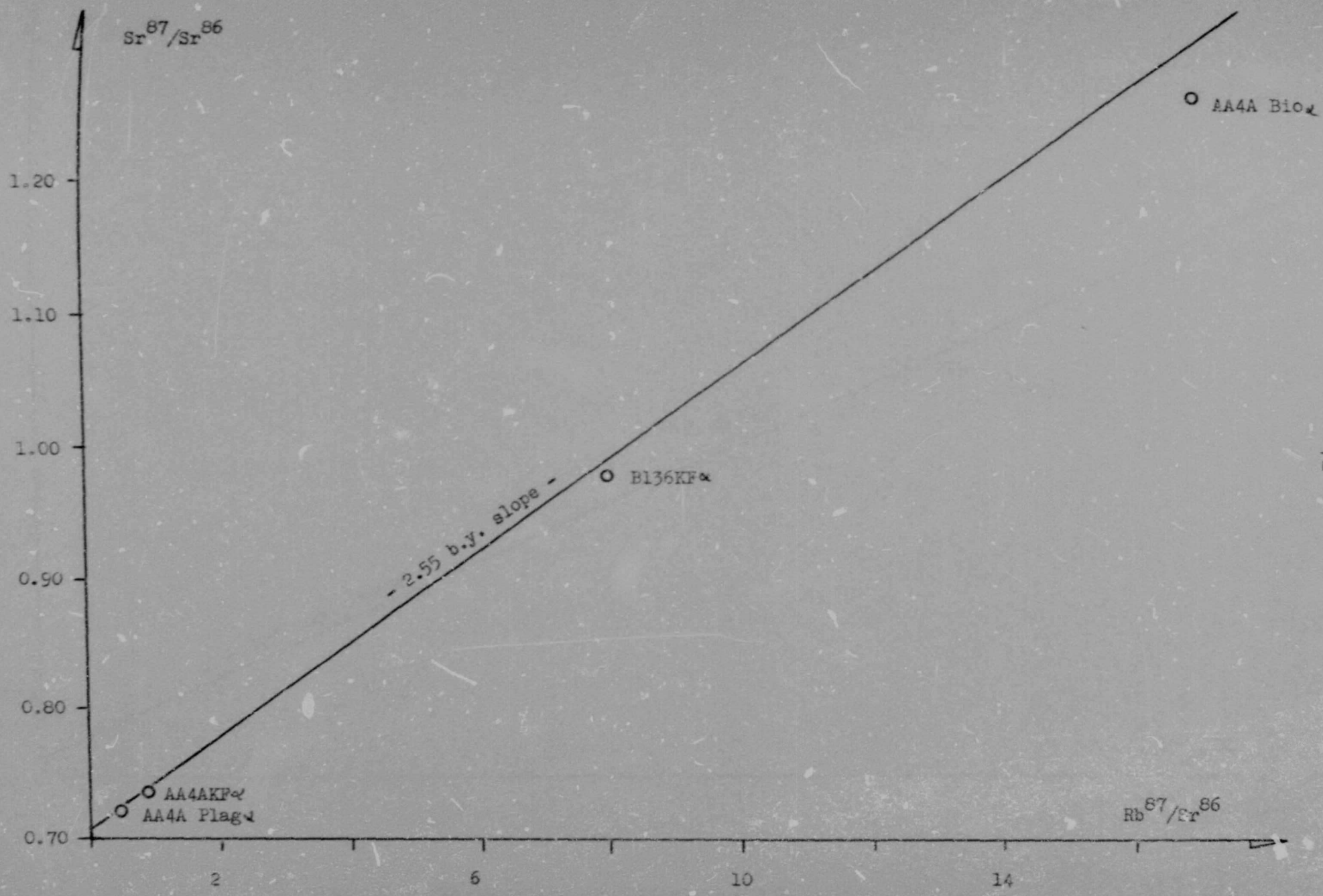
PLOT OF THE PEGMATITES INTRUSIVE IN THE NELSPRUIT MIGMATITE - Figure 15



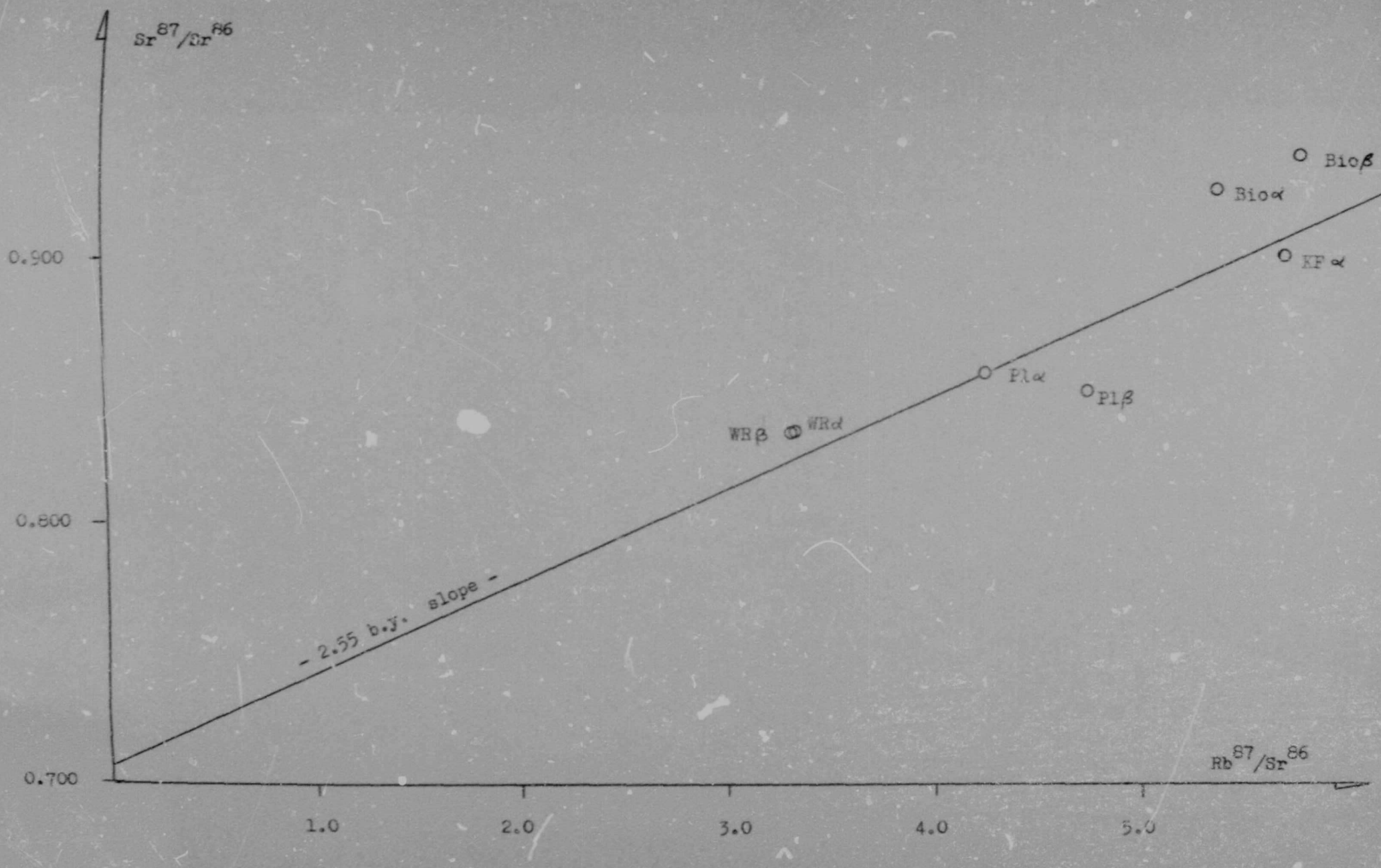
NELSPRUIT MIGMATITE: PLOT OF THE "BASIC BEHIND" - Figure 16



MPAGENI TOTAL ROCK SAMPLES ISOCHRON PLOT - Figure 17



MPAGENI SEPARATED MINERALS PLOT - Figure 18

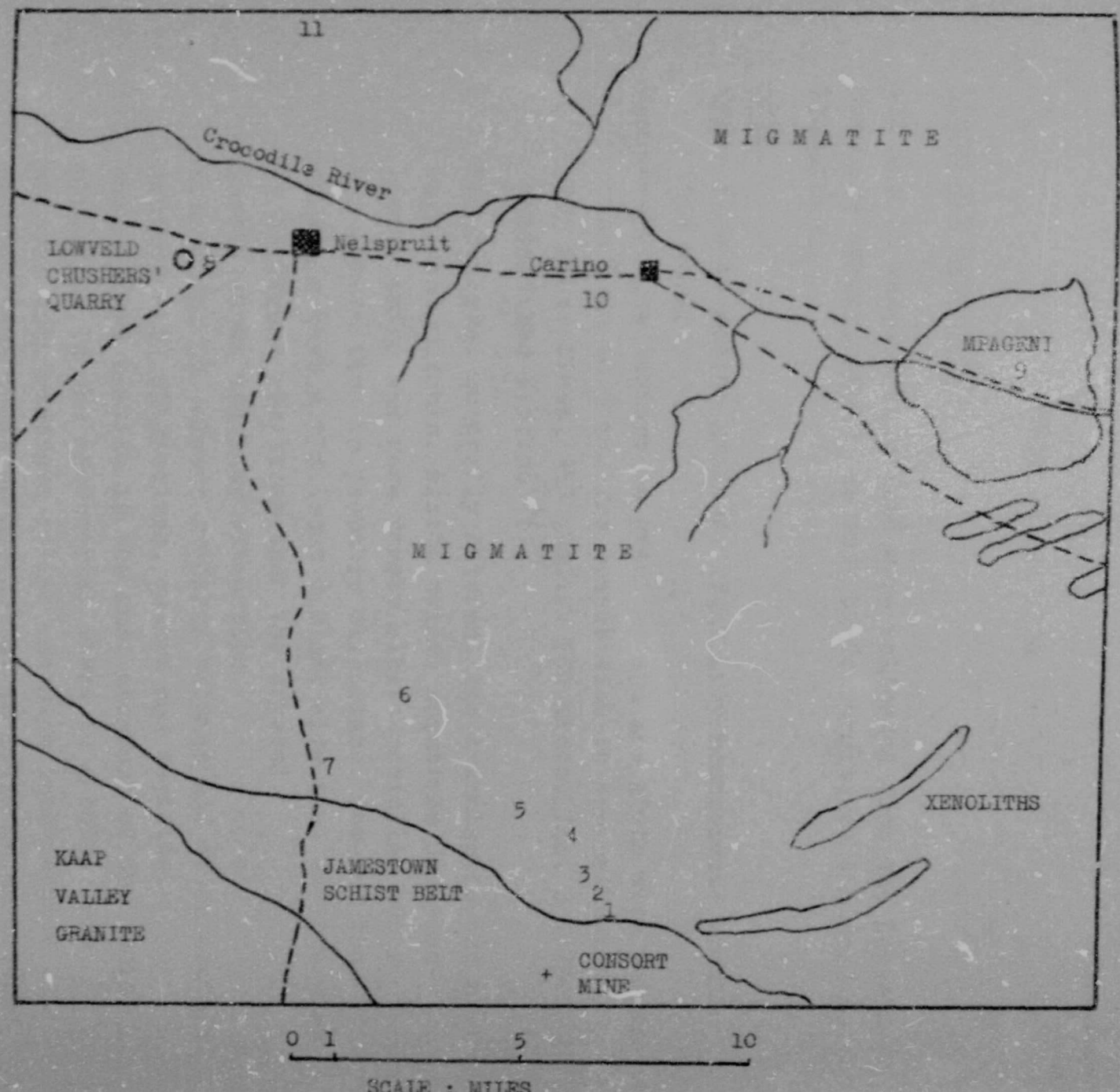


MPAGE1: SAMPLE AA5AWR AND SEPARATED MINERALS PLOT - Figure 19

MAP 3

SAMPLES LOCALITY

1	AA10	8	OG38A
	AA11		OG38B
	AA12		OG38C
			OG38D
2	AA7		OG38E
	AA8		OG38F
	AA9		OG38G
3	AA14M	9	AA2
	AA14F		AA3
	AA15M		AA4A
	AA15F		AA4B
	AA16		AA4C
			AA5A
4	AA17		AA5B
			B136
5	AA18		
		10	B134
6	AA19		
		11	NW5
7	AA13G		
	AA13M		
	AA13I		
	AA13P		



APPENDIX I
SAMPLE DESCRIPTION

1. NELSPRUIT MIGMATITE

All the OG samples described were collected from the Lowveld Crushers quarry, two miles west of Nelspruit, on the road to Middelburg.

OG3A:

Type: fine to medium grained, light grey homogeneous granitic rock.

Microscopy: The texture is granitic and the grain size varies from 1 mm to 3 mm. The composition is approximately 40% plagioclase, 35% quartz, 20% microcline, 2 - 3% chloritised biotite(x).

Plagioclase: generally altered, the twinning is not always recognizable. Albite twins, sometimes Carlsbad-albite twins and more rarely albite-pericline occur. The composition is probably oligoclase. Some of the crystals have a rim about 0.2 mm. wide that extinguishes in different positions than the crystal.
Quartz shows undulose extinction.
Microcline is always gridiron twinned and often contains inclusion of plagioclase, quartz and sericite.
Chloritised biotite is the most abundant of the femic minerals. In the accessories there is a colourless mineral with moderate relief and high interference colours that could be muscovite, sericite or an altered pyroxene. Other accessories are sphene, allanite, iron ore.

OG38B:

Type: pegmatite, light coloured, with some rusty coloured alteration product (?).

Microscopy: The texture is granitic. Some crystals are from 2 to 3 cm in size, but generally the size varies from more than 6 mm. to very fine.

(x) For every sample the mineral abundances were estimated visually.

The rock is composed mostly of quartz and microcline comprising respectively 48 and 40%. Plagioclase is also present (about 10%).
Quartz has mosiac texture.
Microcline is fresh, usually twinned.
Plagioclase: possibly there are two varieties; some are untwinned and altered while others are fresh and twinned. The composition of the fresh crystals is oligoclase.
Muscovite: small amounts were noticed.
Accessories are iron ore and rutile.

OG38C:

Type: fine to medium grained, light grey homogeneous granitic rock. The microcline is white and some crystals are up to 5 mm. in size.

Microscopy: the rock has similar composition and texture as OG38A.

OG38D:

Type: fine to medium grained, light grey homogeneous granitic rock.

Microscopy: same compostion and texture as OG38A except for a slightly bigger amount of chloritised biotite.

OG38F:

This rock cannot be distinguished macroscopically from OG38B and under the microscope it shows approximately the same texture and composition as OG38B, the difference being that the plagioclase, both the twinned and the untwinned, is fresh.

OG38G:

This rock is also very similar to OG38B but there is a smaller amount (35 - 40%) of microcline and the plagioclase is more abundant (20 - 25%) and less altered. The mica content is very small.

KP:This sample has been divided into

(a) KPW:

Type: banded gneiss - this sample is composed mostly of the more acid bands that have a light pinkish colour and are of granitic appearance, medium to coarse grained (see photograph no. 7).

Occurrence: approximately two and a half miles north of the Consort Mine in the Krokodil Poort hills.

Microscopy: the texture is porphyroblastic. The matrix is composed mostly of plagioclase and quartz with a slight predominance of the former, chloritised biotite approximately 2 - 3%; grain size from very fine to about 3 mm. Quartz has a cataclastic texture, the grains seem to have been crushed down to a very fine size.
Plagioclase appears in two forms: twinned, rather fresh oligoclase and untwinned, sericitized variety. Twinning planes are often bent and cracked.
Sphene is the most common accessory mineral, followed by some muscovite or sericite and iron ore minerals.
Microcline (about 30%) forms phenocrysts. It usually shows crossed twinning and less frequently Carlsbad. Some of the crystals are untwinned and show hairline perthite.

(b) KPB:

This sample is the mafic portion of the KP rock.

Type: dark grey in colour; medium grained, homogeneous in texture (see photograph 7).

Microscopy: this rock is very similar to KPW except for the fact that the chloritised biotite content is 15 - 20% and the black magnetic ore is also in slightly larger proportion.

NW5:

Type: whitish, coarse to medium grained granitic rock.

Occurrence: five miles north of Nelspruit on the Nelspruit - White River road.

Microscopy: the texture is porphyroblastic. The matrix is composed mostly of quartz and oligoclase in the ratio

of approximately 2/5. Biotite constitutes about 10% of the rock. The grains in the matrix vary in size from about 6 mm. to very fine.
Plagioclase: generally unaltered (in places very slightly altered), twinned (albite and rarely pericline) and very finely laminated.
Biotite is unaltered, greenish brown.
Sphene and iron ore occur in the amount of 1 - 2%.
Accessories: zircons with pleocroic aureole, apatite in needles and some allanite.
The porphyroblasts are twinned microcline; they make up about 30% of the total rock.
Black band: adjacent to this rock a very dark, fine grained phase occurs. Under the microscope this rock appears to be formed in large part of biotite and hornblende in the ratio respectively of 3/1. About 25% of the rock is formed by quartz and oligoclase in equal proportions. Accessories are sphene and ore minerals.

VC:
Type: fine grained, finely banded gneiss.
Occurrence: approximately two miles north of the Consort Mine.
Microscopy: the composition is similar to NW5 but the texture differs - the quartz is cataclastic, the microcline and the oligoclase crystals are rounded, and the biotite has been bent around the larger and more competent crystals. The oligoclase shows undulose extinction. The more mafic bands contain up to 60% felsic minerals and the rest is composed mainly of biotite and ore minerals. Hornblende and sphene are accessories.

AA7:
Type: light grey, medium grained homogeneous granitic rock.
Occurrence: about half a mile north of the main granite contact north of the Consort Mine. It forms an irregular dyke-like body more than a 100 feet wide.
Microscopy: the texture is porphyroblastic. The porphyroblasts are oligoclase and microcline with a small preponderance of the latter. They measure 4 to 6 mm. in

diameter. The oligoclase is cloudy and only rarely twinned. The microcline shows hairline perthite and sometimes seems to have a zonal structure.
The matrix minerals range in size from 2 mm. to very fine. The main component is quartz (about 60%) with mosaic texture, oligoclase (approximately 35%) fresh and with cracked albite twins in places.
Biotite occurs in minute flakes, it is strongly pleochroic and rather fresh.
Accessories are black ore minerals, apatite and altered allanite in small crystals with radial fractures around them.

AA9:

Type: fine grained, dark grey homogeneous rock with whitish felsic bands. The sample consists of the grey rock with a felsic band approximately two inches thick with a basic rim about 2 mm. thick (see photograph 9).
The rock has been sliced into three portions each containing respectively the felsic band (AA9F), the basic rim (AA9BB) and the mafic portion (AA9M).

Occurrence: approximately a quarter mile north of the main granite contact, north of the Consort Mine.

AA9F:

Type: medium grained, whitish granitic rock.

Microscopy: the compostion is approximately 20% microcline and for the rest almost equal amounts of quartz and plagioclase. The texture is cataclastic and quartz and plagioclase have been finely ground.
Plagioclase is sericitized, the biotite (1 - 2% of the total rock) is chloritised; other accessories are some sphene and rare ore minerals.

AA9BB:

This is composed of more than 50% chloritised biotite. The K-feldspar is more abundant than in AA9F amounting to approximately 25%. The minerals have all undergone pressure stress and are finely ground. The amount of K-felspar was determined by staining with cobaltinitrate. Black minerals occur in about 1 - 2%.

AA9M:

Type: fine to medium grained, grey homogeneous rock.

Microscopy: the compostion is quartz 30%, K-felspar untwinned and altered (recognized by staining), and for the rest sericitized plagioclase.
Allanite, sphene and black ore minerals are the more abundant accessories.

AA10:

Type: white mylonitic rock.

Occurrence: fifty feet north of the main granite contact, north of the Consort Mine.

Microscopy: cataclastic texture. The minerals have been ground to sizes less than 0.1 mm. Some fragments are bigger and from these oligoclase, untwinned K-felspar and muscovite could be recognized.

AA11:

Type: dark grey, medium grained gneiss (see photograph 12).

Occurrence: eighty feet from the contact, north of the Consort Mine.

Microscopy: the texture is cataclastic. Rounded microcline and oligoclase crystals occur with 2 to 4 mm. diameter. The composition is approximately 30% quartz, 35% plagioclase, 28% microcline, biotite and accessories, the most abundant of which is sphene.
Microcline presents twinning (gridiron) or is untwinned and has hairline perthite; the oligoclase is partly sericitized; and the biotite of greenish brown colour is frequently chloritised.

AA12:

Type: porphyrobloastic, light coloured rock (see photograph 13).

Occurrence: 98 feet from the main granite contact north of the Consort Mine.

Microscopy: it has the same texture as AA11, but the phenocrysts are considerably larger (4 - 8 mm.)
The composition is 35% quartz, 35% microcline and 29% oligoclase approximately. The minerals have similar features to those of AA11; the biggest difference is in

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