GSA DATA REPOSITORY 2010060

Supplementary Material

Table DR1: Bulk major element composition (average and root mean square over N analyses) of magmatic rocks from the Mât river. Analyses were performed using a Panalytical AXIOS X-ray fluorescence spectrometer at La Réunion University. The spectrometer was calibrated using eight international basic rock standards (NCS standards DC71301, DC72301, DC72302, DC71304, DC73303; CRPG-CNRS standard BE-N and USGS standards BCR-2 and BIR-1). The calibration was then checked again the BHVO-2 USGS basalt standard, yielding an uncertainty on concentration measurements of 1–2 % for highly concentrated oxides and 2 – 5 % for minor oxides.

Concentration (wt%)	Gabbro	Basic dikes and sills	Differentiated dikes
SiO_2	44.81 ± 3.54	43.68 ± 1.74	46.48 ± 2.89
Al_2O_3	11.24 ± 3.31	9.14 ± 0.18	14.09 ± 0.82
MgO	12.73 ± 2.29	19.76 ± 6.18	4.40 ± 2.54
CaO	15.77 ± 1.64	7.32 ± 1.91	8.07 ± 1.69
Fe_2O_3	10.26 ± 7.73	12.72 ± 0.62	12.86 ± 1.72
MnO	0.14 ± 0.03	0.17 ± 0.02	0.20 ± 0.03
Na_2O	0.80 ± 0.37	1.34 ± 0.53	3.30 ± 0.63
K_2O	0.13 ± 0.06	0.36 ± 0.14	1.62 ± 0.56
TiO_2	1.42 ± 1.31	1.66 ± 0.44	3.16 ± 0.52
P_2O_5	0.01 ± 0.01	0.18 ± 0.06	0.47 ± 0.13
LOI	1.94 ± 1.14	2.50 ± 2.21	3.67 ± 2.79
Sum	99.24	99.83	98.31
N	6	13	20

Figure DR1: Pictures of the M-2 outcrop localized on a geological map. a) The gabbro and the pile of sheeted basic sills above. A 10 m-scale lens of ductilely-sheared gabbro is pinched between the sheeted sills. Steeply-dipping basic dikes and normal faults in the gabbro are cut by a differentiated dike moulding deformation structures. b) Upper part of the pile of sheeted sills. Some sills are deformed and altered in the greenschist facies whereas others remain intact. c) Closer views of the differentiated dike show well preserved vacuoles inflected by magmatic flow and later filled with calcite, indicating that the dike did not suffer deformation and greenschist facies alteration. d) Jigsaw-cracked clast of basalt with a tail of pulverized fragments within the breccia e) Fluid-like deformation of an ash layer within the breccia. f) 10 m-scale block of picritic pahoehoe lavas within the basic breccia and just above the pile of sheeted basic sills. g) Greenschist facies, ductile shearing deformation toward the north at the base of the basic breccia and the top of the pile of sills. h) 20 m-long shear planes and boudinaged elements in the basic breccia. This picture is taken in the continuity of the right side of Figure DR1g.

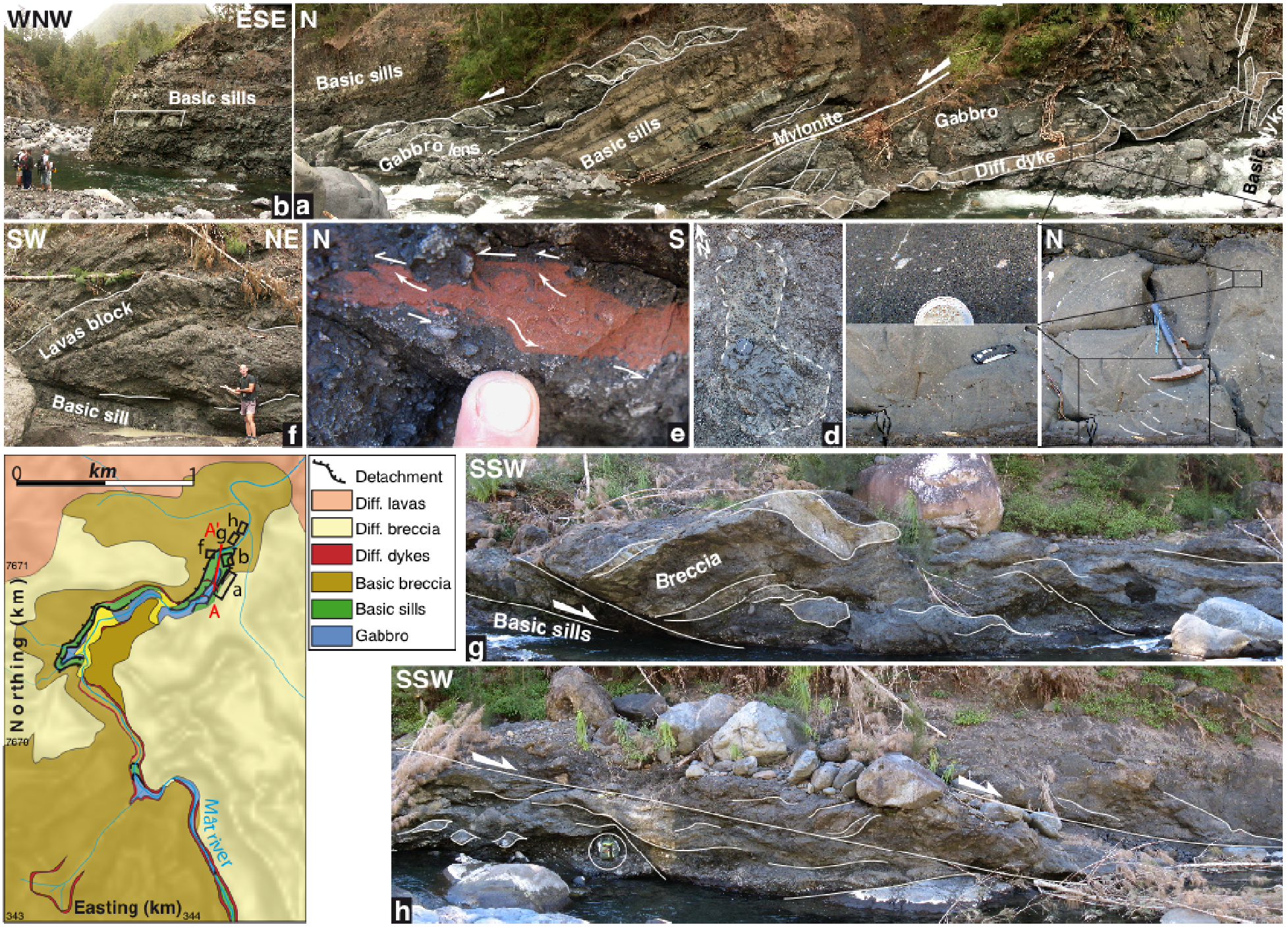
WNW
ESE
Basic sills
b
N
Basic sills
Gabbro lens
Basic sills
Mylonite
Gabbro
Diff. dyke
Basic dyke
a
SW
NE
Lavas block
Basic sill
f
N
S
e
N
d
N
km
0
1
A'
A
h
g
f
b
a
7671
7670
Northing (km)
Mårriver
Easting (km)
343
344
Detachment
Diff. lavas
Diff. breccia
Diff. dykes
Basic breccia
Basic sills
Gabbro
SSW
Breccia
Basic sills
g
SSW
h

Figure DR2: Strain analysis of kinematic indicators of brittle deformation in the basic breccia, at five different locations within the Cirque of Salazie (see Fig. 1b for the location of outcrops M-1, M-3, M-4, FJ-1 and FJ-2; data at M-2 are shown in Fig. 2). Stereo diagrams are equal area, lower hemisphere. Basic dikes are represented as poles (empty squares), and faults as striated planes (black dots are slickenlines, arrows represent the observed sense of slip, some faults have no sense of slip and/or striation). The orientation and plunge of principal stresses (five-, four- and three-legged stars represent σ1, σ2 and σ3, respectively) have been computed from complete fault data only (i.e. striated faults with an observed sense of slip) using the statistical method of Angelier (1984).