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**Tracing wedge-internal deformation by means of strontium isotope systematics of vein carbonates**

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**Supplementary Material**

**Table S1.** Radiogenic strontium isotope ratios of vein carbonates

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sample ID | | 87Sr/86Sra | | Description | |
| *Ultrahelvetic flysch unit (Globotruncana marl)*  *Sampling area 1: 46.890ºN, 9.153ºE* | | | | | |
| 13F76A | | 0.70763 | | G1 calcite shear vein | |
| 13F76B | | 0.70757 | | G1 calcite shear vein | |
| 13F79A | | 0.70787 | | G1 calcite shear vein | |
| 13F79B | | 0.70757 | | G1 calcite shear vein | |
| 13F80A | | 0.70776 | | G1 calcite shear vein | |
| 13F80B | | 0.70779 | | G1 calcite shear vein | |
| 13F80C | | 0.70771 | | G1 calcite shear vein | |
| 13F81A | | 0.70774 | | G1 calcite shear vein | |
| 13F81B | | 0.70770 | | G1 calcite shear vein | |
| 13F81C | | 0.70750 | | G1 calcite shear vein | |
| 13F83 | | 0.70770 | | G1 calcite shear vein | |
| 13F77 | | 0.70862 | | G2 quartz-calcite vein | |
| 13F89 | | 0.70880 | | G3 quartz-calcite vein | |
| *Ultrahelvetic flysch unit (Globotruncana marl)*  *Sampling area 2: 46.874ºN, 9.126ºE* | | | | | |
| 14F42 | | 0.70789 | | G1 calcite shear vein | |
| 14F43 | | 0.70790 | | G1 calcite shear vein | |
| 13F64A | | 0.70818 | | G2 quartz-calcite vein | |
| 13F64B | | 0.70830 | | G2 quartz-calcite vein | |
| 14F32 | | 0.70832 | | G2 quartz-calcite vein | |
| 14F33 | | 0.70828 | | G2 quartz-calcite vein | |
| 14F37 | | 0.70820 | | G2 quartz-calcite vein | |
| 14F38 | | 0.70808 | | G2 quartz-calcite vein | |
| 14F39 | | 0.70810 | | G2 quartz-calcite vein | |
| 14F48 | | 0.70804 | | G2 quartz-calcite vein | |
| 14F49 | | 0.70858 | | G2 quartz-calcite vein | |

**Table S1 continued.**

|  |  |  |
| --- | --- | --- |
| 14F50 | 0.70836 | G2 quartz-calcite vein |
| 14F55 | 0.70822 | G2 quartz-calcite vein |
| 13F44 | 0.70886 | G3 quartz-calcite vein |
| 13F61 | 0.70836 | G3 quartz-calcite vein |
| 13F62 | 0.70824 | G3 quartz-calcite vein |
| 14F41 | 0.70823 | G3 quartz-calcite vein |
| 14F45 | 0.70808 | G3 quartz-calcite vein |
| 14F47 | 0.70813 | G3 quartz-calcite vein |
| 14F31 | 0.70838 | G3 quartz-calcite vein |
| 14F30 | 0.70837 | G3 quartz-calcite vein |
| 14F51 | 0.70830 | G3 quartz-calcite vein |
| 14F52 | 0.70844 | G3 quartz-calcite vein |
| 14F53 | 0.70830 | G3 quartz-calcite vein |
| 13F31B | 0.70830 | Mineralized tension gash |
| 13F45B | 0.70819 | Mineralized tension gash |
| 13F52B | 0.70823 | Mineralized tension gash |
| 14F57 | 0.70858 | Mineralized tension gash |
| *Imbricate thrust fault – Ultrahelvetic/South-Helvetic Sampling site: 46.9597ºN, 9.1881ºE* | | |
| 13F18A | 0.70833 | Calcite extension vein (hanging wall) |
| 13F18B | 0.70821 | Calcite extension vein (hanging wall) |
| 13F18C | 0.70821 | Calcite extension vein (hanging wall) |
| 13F18D | 0.70826 | Calcite extension vein (hanging wall) |
| 13F16A | 0.70821 | Calcite extension vein (footwall) |
| 13F16B | 0.70824 | Calcite extension vein (footwall) |
| 14F19A | 0.70826 | Calcite precipitate on small thrust (footwall) |
| 14F19B | 0.70825 | Calcite precipitate on small thrust (footwall) |
| 13F17 | 0.70802 | G1 calcite shear vein (footwall) |
| 14F20 | 0.70808 | G1 calcite shear vein (footwall) |
| 13F3 | 0.70839 | G3 quartz-calcite vein (footwall) |
| 13F4 | 0.70851 | G3 quartz-calcite vein (footwall) |
| 13F13B | 0.70855 | G3 quartz-calcite vein (footwall) |
| 13F15B | 0.70910 | Quartz-calcite fissure |
| 14F18 | 0.70912 | Quartz-calcite fissure |
| 13F57 | 0.70945 | Quartz-calcite fissure |
| *South-Helvetic thrust slice Sampling site: 47.1407°N, 9.1073°E* | | |
| 14F6 | 0.70826 | Calcite shear vein in marlstone matrix |
| 15F1 | 0.70825 | Calcite shear vein in marlstone matrix |
| 15F2A | 0.70816 | Calcite shear vein in marlstone matrix |
| 15F2B | 0.70820 | Calcite shear vein in marlstone matrix |
| 15F3 | 0.70817 | Calcite shear vein in marlstone matrix |
| 15F4 | 0.70819 | Calcite shear vein in marlstone matrix |
| 15F5 | 0.70819 | Calcite shear vein in marlstone matrix |
| 15F6 | 0.70820 | Calcite shear vein in marlstone matrix |
| 15F7 | 0.70817 | Calcite shear vein in marlstone matrix |
| 15F8 | 0.70818 | Calcite shear vein in marlstone matrix |
| 15F9 | 0.70816 | Calcite shear vein in marlstone matrix |
| 15F10 | 0.70820 | Calcite shear vein in marlstone matrix |

**Table S1 continued.**

|  |  |  |
| --- | --- | --- |
| 15F13 | 0.70820 | Calcite shear vein in marlstone matrix |
| 15F16A | 0.70815 | Calcite shear vein in marlstone matrix |
| 15F16B | 0.70817 | Calcite shear vein in marlstone matrix |
| 14F8 | 0.70817 | Calcite extension vein in boudin |
| 14F10 | 0.70839 | Calcite extension vein in boudin |
| 15F15A | 0.70821 | Calcite extension vein in boudin |
| 15F15B | 0.70821 | Calcite extension vein in boudin |
| 15F17A | 0.70816 | Calcite extension vein in boudin |
| 15F17C | 0.70819 | Calcite extension vein in boudin |
| 15F18 | 0.70816 | Calcite extension vein in boudin |
| *North-Helvetic Flysch thrust fault Sampling site: 46.8877ºN, 9.1273ºE* | | |
| 13F10 | 0.70862 | Quartz-calcite extension vein |
| 14F26 | 0.70826 | Quartz-calcite extension vein |
| 14F22-A | 0.70829 | Quartz-calcite extension vein |
| 14F22-B | 0.70865 | Quartz-calcite fissure |
| 14F21 | 0.70865 | Quartz-calcite fissure |
| a The 2s.d. uncertainty on the 87Sr/86Sr ratios is given by the external reproducibility of our methods and is ± 0.00005. | | |

**Table S2.** Radiogenic isotope data of host rock samples

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sample IDa | Rb (ppm) | Sr (ppm) | 87Rb/86Sr | 87Sr/86Sr | (87Sr/86Sr)*i* = 25 Mab |
| 13F35-UHF-D | 202 | 369 | 1.581 ± 0.002 | 0.71028 ± 0.00004 | 0.70971 |
| 13F43-UHF-D | 56 | 398 | 0.4106 ± 0.001 | 0.70914 ± 0.00002 | 0.70899 |
| 13F47-UHF-D | 56 | 764 | 0.213 ± 0.002 | 0.70887 ± 0.00001 | 0.70879 |
| 13F51-UHF-D\* | 243 | 50 | 14.0981 ± 0.002 | 0.72147 ± 0.00002 | 0.71639 |
| 13F90-NHF-D\* | 83 | 13 | 18.6326 ± 0.139 | 0.72206 ± 0.00002 | 0.71536 |
| CH-01B-16-NHF-H | 170 | 78 | 6.33 ± 0.07 | 0.71981 ± 0.00002 | 0.71756 |
| CH-01B-16-NHF-H | 68 | 121 | 1.626 ± 0.003 | 0.71243 ± 0.00001 | 0.71185 |
| a UHF = Ultrahelvetic Flysch, NHF = North-Helvetic Flysch; D = Dielforder et al. (2015); \* = previously unpublished data, Rb-Sr analysis as described in Dielforder et al. (2015). H = Hilgers & Sindern (2005) | | | | | |
| b 87Sr/86Sr ratios back calculated to the 25 Ma | | | | | |