**Online Resource 1:** Major features of the Voirons Flysch stratigraphic units. Thicknesses in brackets are decompacted. Rsm : sand:marl ratio

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| Unit | Age | Thickness | Spatial distribution | Lithostratigraphy | Rsm | Sedimentation rate | Sedimentology | Petrofacies | Remarks |
| Voirons Sandstone | Ypresian to Lutetian (E7-E8) | > 750 m  (> 1250 m) | Voirons | Sandy to marly sequence with scarce conglomerates | 2.88 | 0.21 cm/yr | Large diversity  of sedimentary features. Rare dunes. Frequent sharp base | Quartzose + secondary Feldspathic | Most studied unit |
| Bons Mb. | - | 50 m ?  (83 m ?) | NW Voirons | Marly sequence | 0.08 | - |  | Quartzose | Basal unit of the Voirons nappe. Equivalent of the Hellstatt Fm. in the Gurnigel nappe? |
| Signal Mb. | - | Several meters | Voirons crest + SE Voirons | Matrix to clast-supported conglomerates | - | - | Metre-size pink  granite block and limestone block with pink granite inclusions | Quartzose + secondary Feldspathic | Boundaries are  not accurately defined |
| Allinges Mb. | - | 100 - 200 m ?  (125 – 250 m ?) | Allinges Hills | Thick and coarse amalgamated sandstone. Rare marly interval | 0.69 | - | Less coarser than the Vouan Conglomerate Fm. Occurrence of amber (Allingite) | Quartzose + secondary Feldspathic | Exploited in large  quarries |
| Vouan Conglomerate | Lutetian to Bartonian (E9-E11) | 500 m  (625 m (1)) | Vouan, E Voirons  and SW Allinges Hills | Pebbly sandstone to matrix supported conglomerates amalgamated. Rare marly intervals | 2.09 | 0.16 cm/yr (1) | Erosive base, lateral variation, heterogeneous distribution of pebble | Feldspathic | Exploited for  milestone grind. No  equivalent in the Voirons–Wägital Complex |
| Boëge Marl | Lutetian or Bartonian to Priabonian ? | 950 – 400 m ?  (1583 – 667 m) | Ludran Hills and Grande Combe | Marly sequence | 0.28 | 0.07 cm/yr | Frequent upper plane beds and ripples | Quartzose + secondary Feldspathic |  |
| Bruant Sandstone | Priabonian ? | 500 m ?  (833 m ?) | Grande Combe and Tête de Char | Similar to the Voirons  Sandstone Fm. | 0.12 | - | Rare marly intervals | Quartzose + secondary Feldspathic | Top unit. Strong tectonic deformation.  Poor exposition. |
| Fenalet Sandstone | Priabonian ? | 150 m ?  (249 m ?) | Saint-Gingolph | Homogeneous  sand-marl alternation | - | - | Frequent upper plane beds and ripples | Quartzose | Easternmost exposure. No direct affiliation with the rest of the Voirons Flysch. |

(1) The extensive erosion greatly underestimates the sedimentation rate of the Vouan conglomerate Fm.