Supplementary Table 1. For selected samples and constants from table 5 of Hsu (1963); a comparison of Ksp°−dol values calculated by Hsu (1963) and that recalculated in this study using SUPCRT92 (Johnson and others, 1992). The use of SUPCRT92 Ksp°−cal increases the calculated Ksp°−dol by 0.38 log units compared to that calculated with the Garrells and Drever (1952) constant. This shifts the Ksp°−dol value from -16.69 (Hsu, 1963) to -17.07.

Eq (1) Ksp°−dol = [Ca2+] [$γ$Ca2+] [Mg2+] [$γ$Mg2+] (CO32−)2 (from eq (4) Hsu, 1963). Hsu (1963) determines this Ksp°−dol value to demonstrate the effect of loss of CO2 during sampling, which produces a more soluble (larger) estimate for Ksp°−dol, and the advantage of assuming calcite-dolomite equilibrium.

Eq (2) Ksp°−dol=[Mg2+] [Ca2+] Ksp°−cal 2 (Ksp°−cal= 5.1×10−9) (from eq (8) Hsu, 1963). Hsu (1963) determines Ksp°−dol using the Ksp°−cal value from Garrells and Drever (1952) of 5.1×10−9.

Eq (3) Ksp°−dol=[Mg2+] [Ca2+] Ksp°−cal 2 (Ksp°−cal = 3.311×10−9) This studies calculation of the Hsu (1963) dataset using the Ksp°−cal value from Plummer and Busenberg (1982) as implemented in SUPCRT92 (table 1; Johnson and others, 1992).

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| --- | --- | --- | --- |
|  |  | Sample | Hsu., (1963) average |
| 57-28 | 57-111 |
| Hsu (1963) observed | Ca2+×10-3 | 5.5 | 3.35 |  |
| Mg2+×10-3 | 3.69 | 2.95 |  |
| CO32-×10-6 | 1.05 | 3.0 |  |
| Hsu (1963) calculated | Mg:Ca |  |  | 0.78 |
| Eq.1 | 1.6×10−15 | 5.7×10−16 |  |
| Eq.2 | 1.9×10−17 | 2.3×10−17 | 2.0×10−17 |
| This study calculated | Eq.2 pKsp°−dol | 16.73 | 16.64 | 16.69 |
| Eq.3 | 7.77×10−18 | 9.65×10−18 | 8.55×10−18 |
| Eq.3 pKsp°−dol | 17.11 | 17.02 | 17.07 |