

# 1.

Errata and addenda: C-O-H-S fluid composition and oxygen fugacity in graphitic metapelites

p 384. In the section on GCOHS fluids it is stated that H<sub>2</sub>S is the only significant sulfur species in equilibrium with py + po. This is only true in H/O = 2 fluids, at X<sub>O</sub>=1, and low pressure and high temperature in the vicinity of the py melting reaction, carbonyl sulfide (COS) may comprise up to 25 mole % of the fluid. At all P-T conditions, the atomic S content of GCOHS fluids decreases with X<sub>O</sub>.

Fig 3. There was an error in the calculated positions of GCOHS equilibria in the original figure, this figure was corrected, but the text and figure caption were not. As a result the displacements between GCOHS and GCOH equilibria described in the text are slightly less than shown in Fig 3. For example, the displacement of muscovite dehydration is 37 C, as opposed to 13 C as stated. The displacements still diminish rapidly with temperature, so the conclusion that the effect of sulphur on low to mid-metamorphic grade C-O-H fluid speciation is minor is unaltered. The cc = wo equilibrium is not shown in Fig 3 at high temperature for GCOHS fluids because py melts at about 790 C.

Fig 5a. The S/H ratios reported in this figure and in the text were calculated incorrectly as  $\frac{2(X_{H_2S}+X_{COS})}{X_{H_2O}+X_{H_2}+2X_{CH_4}}$  instead of  $\frac{2(X_{H_2S}+X_{COS})}{X_{H_2O}+X_{H_2}+X_{H_2S}+2X_{CH_4}}$ . This error is unimportant at S/H ratios < 0.1, but for higher values it becomes important, the maximum S/H ratio that can be achieved in GCOHS H/O = 2 fluids at the conditions shown in Fig 5 is 0.64 (at 1023 K and 500 bar). The correct S/H ratios can be approximated by multiplying those shown in Fig 5a by  $\frac{X_{H_2O}}{X_{H_2O}+X_{H_2S}}$ .

Fig 5d. The X<sub>H<sub>2</sub>S</sub> calculated to be in equilibrium with po (Fe<sub>0.95</sub>S) in this figure are about an order of magnitude too high. The correct values can be calculated with the FORTRAN program COHSRK available from the authors.

It may be helpful to note that  $X_O^F = \frac{n_o}{n_o+n_H}$ , and that for  $X_O^F > \frac{1}{3}$ , C-O-H fluids are very nearly binary H<sub>2</sub>O–CO<sub>2</sub> mixtures, in which case the approximation  $X_{CO_2} \approx \frac{3X_O-1}{X_O+1}$  is reasonable.

Since writing the paper, we have presented this material at meetings only to find that many people are convinced that we believe all GCOH fluids are H:O = 2. We neither believe this, nor was it our intention in writing the paper to suggest this, rather we believe that the H:O = 2 model provides a useful working hypothesis for fluid composition in graphitic metapelites, and it should be used just as the X<sub>H<sub>2</sub>O</sub> = 1 model is commonly applied in non-graphitic rocks. In subsequent work on graphitic rocks we have found a metapelite where phase equilibria indicate H:O ratios approaching one for early C-O-H fluids; and in a metacarbonate, where one would expect low H:O ratios, we have found evidence that the H:O ratios were near 2:1.