Figure 1: At low temperatures we observed smaller groups of aligned spins. We concluded that the influence of the heat (i.e. $\tau\sigma$) on the free energy was low and therefore, that the energy U was minmised.

Given the partition function $Z = (2\cosh(\epsilon/\tau))^N$, we calculated the internal energy using,

$$
\begin{aligned}
U &= \tau^2 \partial_\tau \ln(Z) && (1)\\
&= \tau^2 \partial_\tau \ln\left(2\cosh\left(\frac{\epsilon}{\tau}\right)^N\right)\\
&= N\tau^2 \partial_\tau \ln\left(2\cosh\left(\frac{\epsilon}{\tau}\right)\right)\\
&= N\tau^2 \partial_\tau \left(2\cosh\left(\frac{\epsilon}{\tau}\right)\right)\frac{1}{2\cosh\left(\frac{\epsilon}{\tau}\right)}\\
&= N\tau^2 \partial_\tau \left(\frac{\epsilon}{\tau}\right)\frac{\sinh\left(\frac{\epsilon}{\tau}\right)}{\cosh\left(\frac{\epsilon}{\tau}\right)}\\
&= -\epsilon N \tanh\left(\frac{\epsilon}{\tau}\right) && (2)
\end{aligned}
$$