are indirectly responsible. Many scientists have for years thought that the world's oceans must considerably affect carbon dioxide levels in the atmosphere. The gas dissolves in the sea, so such a large area of water as an ocean must have some buffering effect. There's little agreement on how great this effect may be.

Carbon dioxide in the oceans contains more carbon 13 than that in the atmosphere. If the sea becomes warmer it will probably give off some of the dissolved gas, or at least dissolve less from the air. Either way the effect should be to increase the proportion of carbon 13 in the atmosphere, as should burning fossil fuels. If the oceans cool, the reverse should happen.

The few records available suggest that sea temperatures off eastern Tasmania have risen since 1940 in sympathy with the climate. If this situation applies for the rest of the Southern Hemisphere, then the proportion of carbon 13 in the atmosphere of the whole world must rise as the oceans and climate of the Southern Hemisphere become warmer, and fall as they cool down.

In fact it's not such a far-fetched idea that events in the southern oceans control carbon dioxide levels over the whole globe. This Hemisphere contains much the larger part of the world's ocean surface, and it now seems that considerable mixing occurs between the gases on either side of the equator.

Such a mechanism could explain why climatic trends in Australia and New Zealand, and perhaps the rest of the Southern Hemisphere, seem to oppose those north of the equator—a hard fact to reconcile with the assumption that increasing carbon dioxide levels are raising world temperatures through the 'greenhouse effect'. Thus the Northern Hemisphere trend toward increasingly warm summers between about 1910 and 1940 coincided with cooler summers here. Between 1940 and the early 1970s, northern summers became cooler and ours slightly warmer.

The Aspendale group points out that if the southern oceans really are exerting this sort of effect on world carbon dioxide levels then the chances are that any produced by burning fossil fuels will be swamped by the far greater natural cycles.

But all this has still to be proved. We know practically nothing about ocean temperature trends, and the Tasmanian information about carbon isotopes has come from three trees growing within a stone's throw of one another. The tests need to be done again on trees coming from many more places.

Stable carbon isotopes in tree rings as climatic indicators. P. J. B. Fraser, R. J. Francey, and G. I. Pearman. *Working Paper, Third International Conference on Stable Isotopes, Wellington, New Zealand,* 1976.

Climatic implications of stable carbon isotopes in tree rings. G. I. Pearman, R. J. Francey, and P. J. B. Fraser. *Nature*, 1976, **260**, 7713.

Atmospheric carbon dioxide levels as indicated by the stable isotope record in wood. J. G. Farmer and M. S. Baxter. *Nature*, 1974, **247**, 273–5.

Dendrochronology and ^{13}C content in atmospheric CO_2. H. D. Freyer and L. Wiesberg. *Nature*, 1974, **252**, 757.