THE EFFECT OF CHANGING THE INITIAL CHEMICAL COMPOSITION ON THE EVOLUTION OF A 20 $M_\odot$ STAR*

(Abstract)

G. BARBARO, G. BERTELLI, C. CHIOSI, and E. NASI
Istituto di Astronomia, Universita di Padova, Italia

The evolution from the Main Sequence up to central He depletion of a 20 $M_\odot$ star with six different sets of initial chemical composition parameters has been followed. Semiconvective regions have been analysed according to the Schwarzschild-Härm criterion.

The comparison of the different evolutionary tracks seems to indicate that during central He-burning two main phases can be displayed: a first one, at the beginning of the burning ($Y_c \gtrsim 0.500$), in which the evolutionary effects are essentially due to the advancement of the H-burning shell, and a late one ($Y_c \lesssim 0.200$), whose behaviour can be accounted for only by the core chemical evolution, with the exception of a phase of secular instability.

This conclusion is supported also by computation of fictitious evolutionary sequences of models in thermal equilibrium both with constant central He content and with constant core mass, which respectively mimic the first and the late phase.

Theoretical distributions of supergiant stars in the different regions of the HR diagram are derived in the cases of both the Schwarzschild-Härm and the Ledoux criterion, and compared with observed distributions of galactic supergiant stars. The comparison seems to indicate that a better agreement is obtained when the neutrality condition adopted for semiconvective region is the Schwarzschild-Härm condition.

A more complete account of this work is to be published in *Astronomy and Astrophysics*.

* This paper was presented by C. Chiosi.

Tayler (ed.), Late Stages of Stellar Evolution, 95. *All Rights Reserved. Copyright © 1974 by the IAU.*

https://doi.org/10.1017/S0074180900017800 Published online by Cambridge University Press