Modeling Dendrite Coarsening and Remelting during Directional Solidification of Al-06wt.% Cu Alloy	
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Abstract: Research efforts have been dedicated to predicting microstructural evolution during solidification processes. The main secondary arm spacing controls the mushy zone's permeability. The aim of the current work was to build a simple sub-grid model that describes the growth and coarsening of secondary side dendrite arms. The idea was to reduce the complexity of the curvature distribution with only two adjacent side arms in concurrence. The model was built and applied to the directional solidification of Al-06wt%Cu alloy in a Bridgman experiment. The model showed its effectiveness in predicting coarsening phenomena during the solidification of Al-06wt%Cu alloy. The results showed a rapid growth of both arms at an earlier stage of solidification, followed by the remelting of the smaller arm. In addition, the results are in good agreement with an available time-dependent expression which covers the growth and coarsening. Such model can be implemented as a sub-grid model in volume average models for the prediction of the evolution of the main secondary arms spacing during macroscopic solidification processes.