The aim of this thesis is to compare two major models of random sets, the well established random closed sets (RACS) and the more recent and more general random measurable sets (RAMS). First, we study the topologies underlying the models, showing they are very different. Thereafter, we introduce RAMS and RACS and reformulate prior findings about their relationship. The main result of this thesis is a characterization of those RAMS that do not induce a corresponding RACS. We conclude by some examples of such RAMS, including a construction of a translation invariant RAMS.