

**Eleftherios Tachtsis**  
*Disasters in metric topology without choice*

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**Abstract:** We show that it is consistent with ZF that there is a dense-in-itself compact metric space  $(X, d)$  which has the countable chain condition (ccc), but  $X$  is neither separable nor second countable. It is also shown that  $X$  has an open dense subspace which is not paracompact and that in ZF the Principle of Dependent Choice, DC, does not imply the disjoint union of metrizable spaces is normal.

**Keywords:** Axiom of Choice, Axiom of Multiple Choice, Principle of Dependent Choice, Ordering Principle, metric spaces, separable metric spaces, second countable metric spaces, paracompact spaces, compact  $T_2$  spaces, ccc spaces.

**AMS Subject Classification:** 03E25, 54A35, 54D20, 54E35, 54E45, 54F05