Component-based Synthesis of Trioxacarcin A


Name the reaction of step 1?
Oppolzer sultam auxiliary-controlled Morita–Baylis–Hillman
Hint: The (S)-enantiomer is obtained after step 2
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Step 6: Why is it important to form the mixed anhydride as the activated species over an acid chloride?
avoiding the Nierenstein reaction

1) DABCO
2) Et₃N, MeOH
3) TBSOTf, DIPEA
4) t-BuOOH, t-BuOK
   anti:syn = 13:1

5) LiOH (aq)
6) ClCO₂i-Bu, Et₃N, then CH₂N₂
7) Et₃N • 3HF
8) DMP, aq. NaHCO₃

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Please provide a mechanism and the name reaction of step 9. 

Kraus Sugimoto annulation
also: Hauser Kraus annulation

Please provide a mechanism for the key step happening in step 13. 

Hint: It’s a 1,3-dipolar cycloaddition reaction.