



Open chromatin features in topological domains and replication TTRs

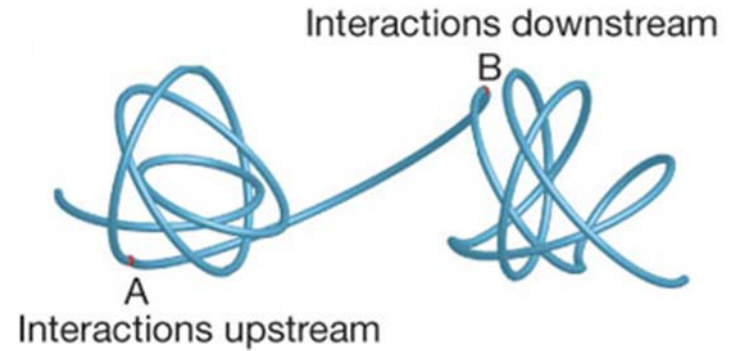
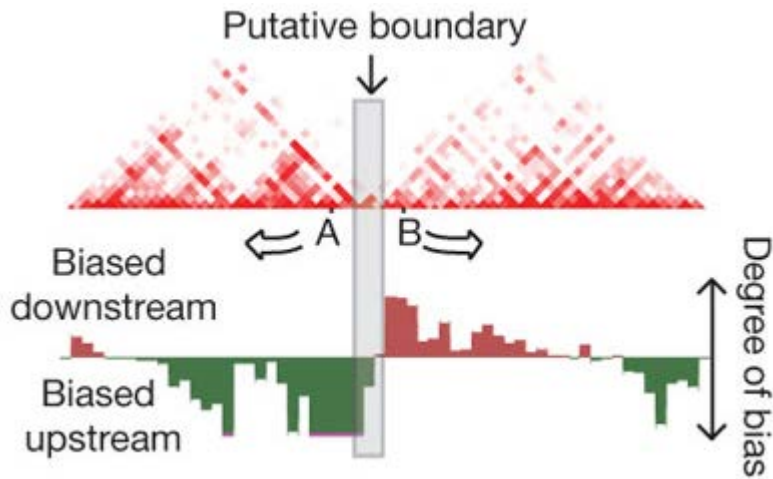
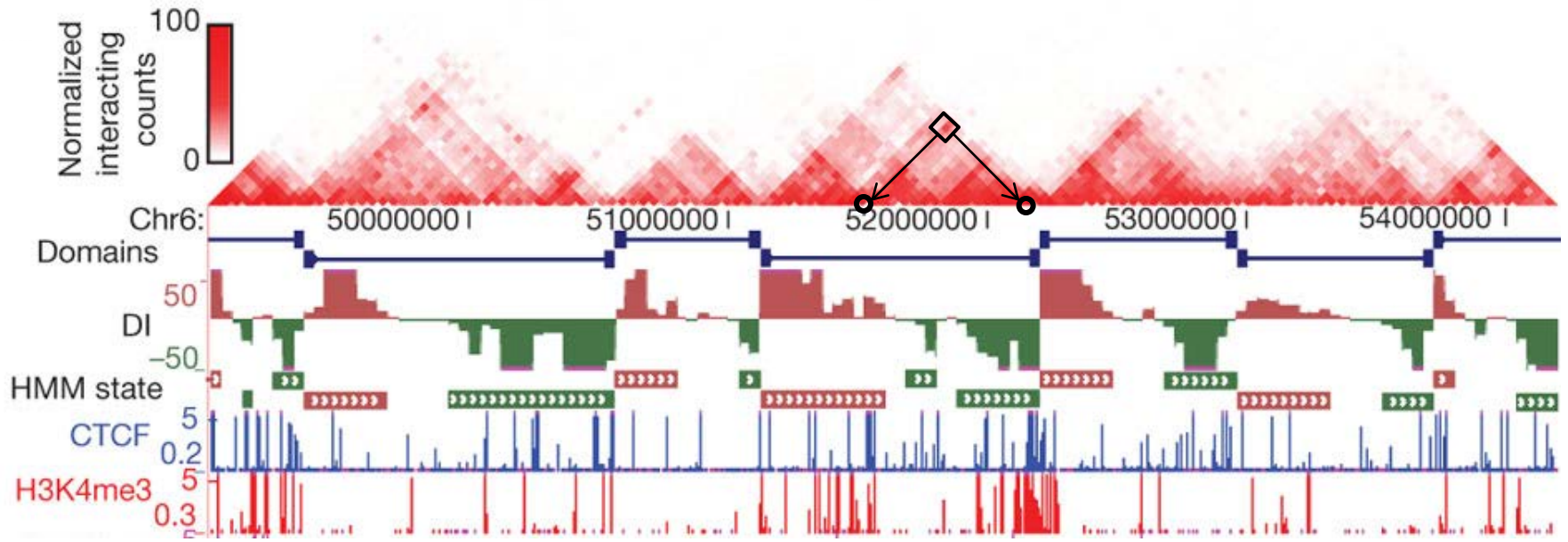
Bob Thurman, Stam Lab, UW

26 July, 2012

mouse ENCODE analysis call

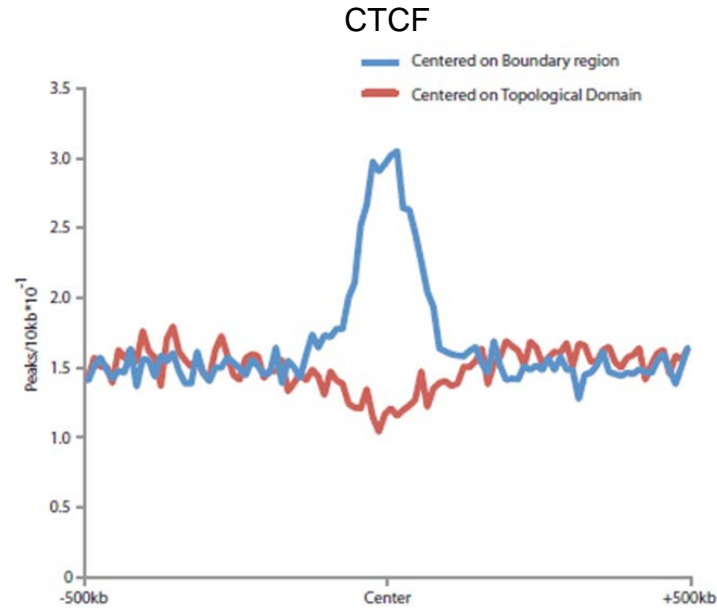
DNaseI at topo-domain boundaries

From Dixon et al., Nature

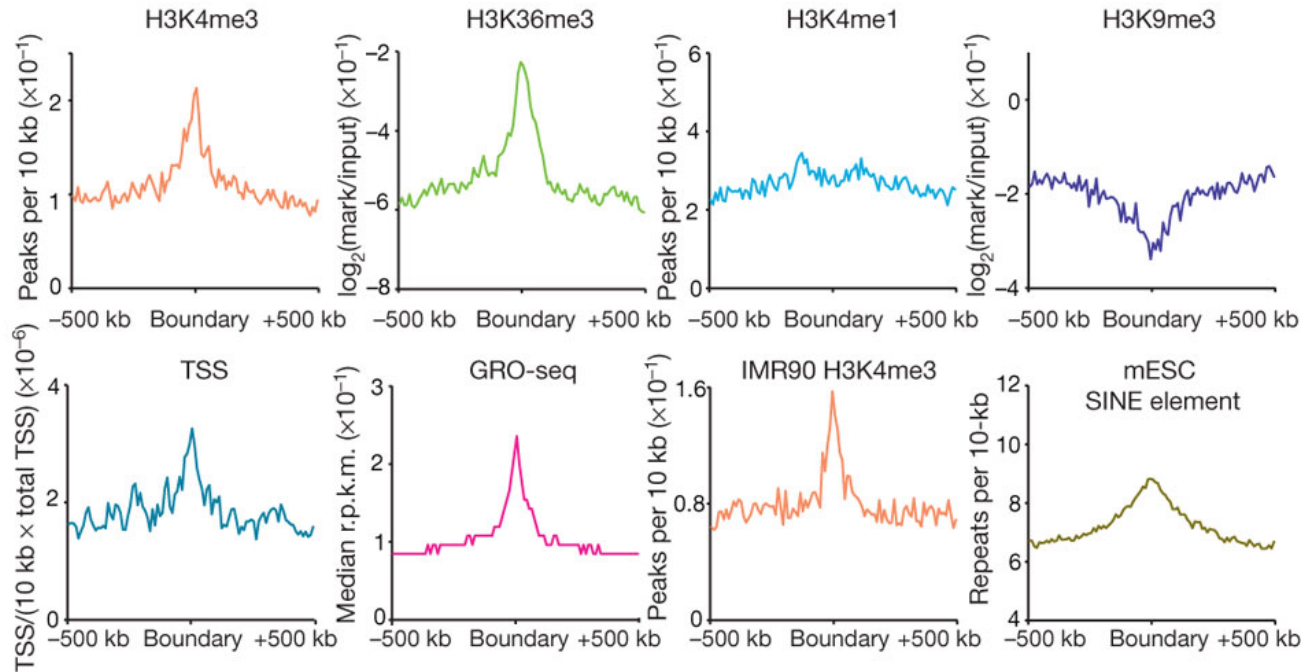


Topo-domain boundary characteristics

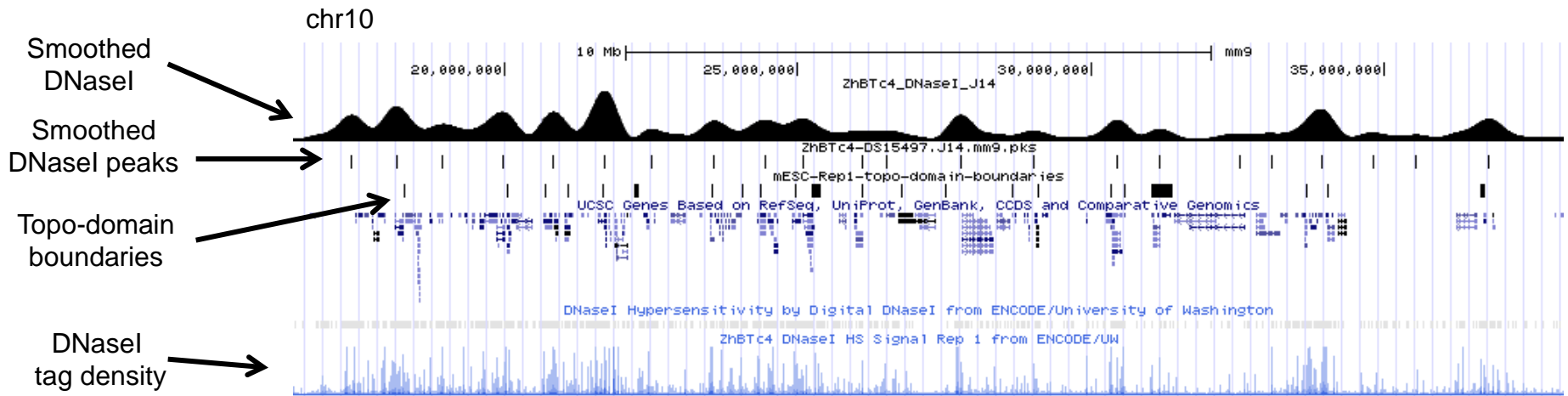
From Dixon et al., Nature (supplement)



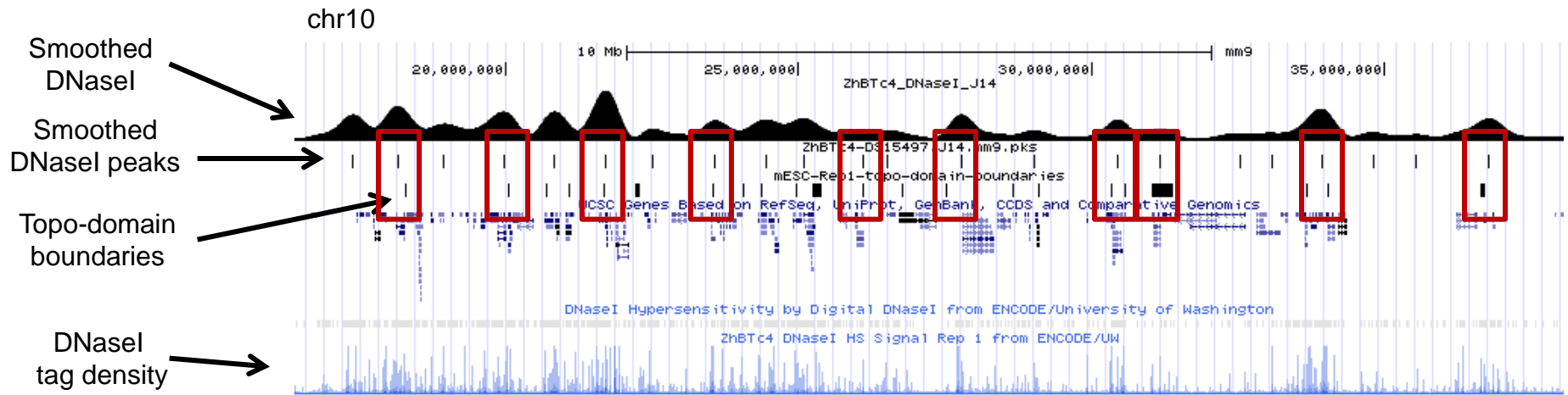
From Dixon et al., Nature



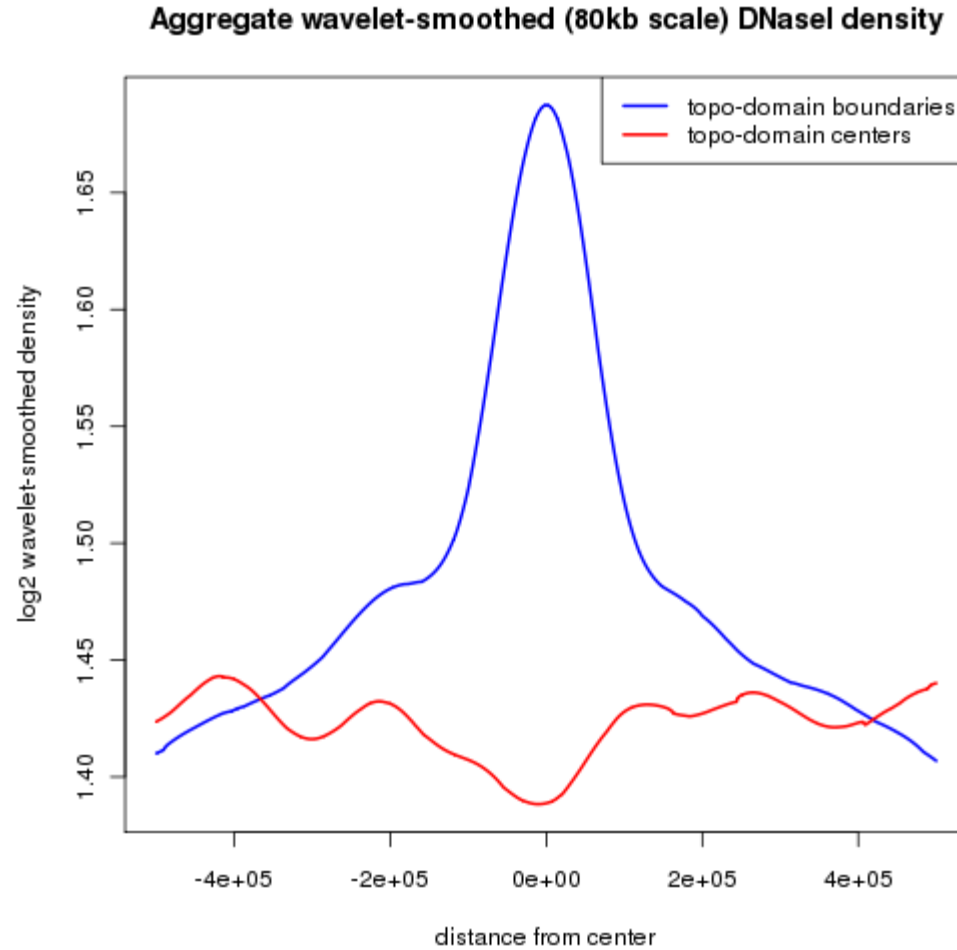
DNaseI at topo-domain boundaries



DNaseI at topo-domain boundaries



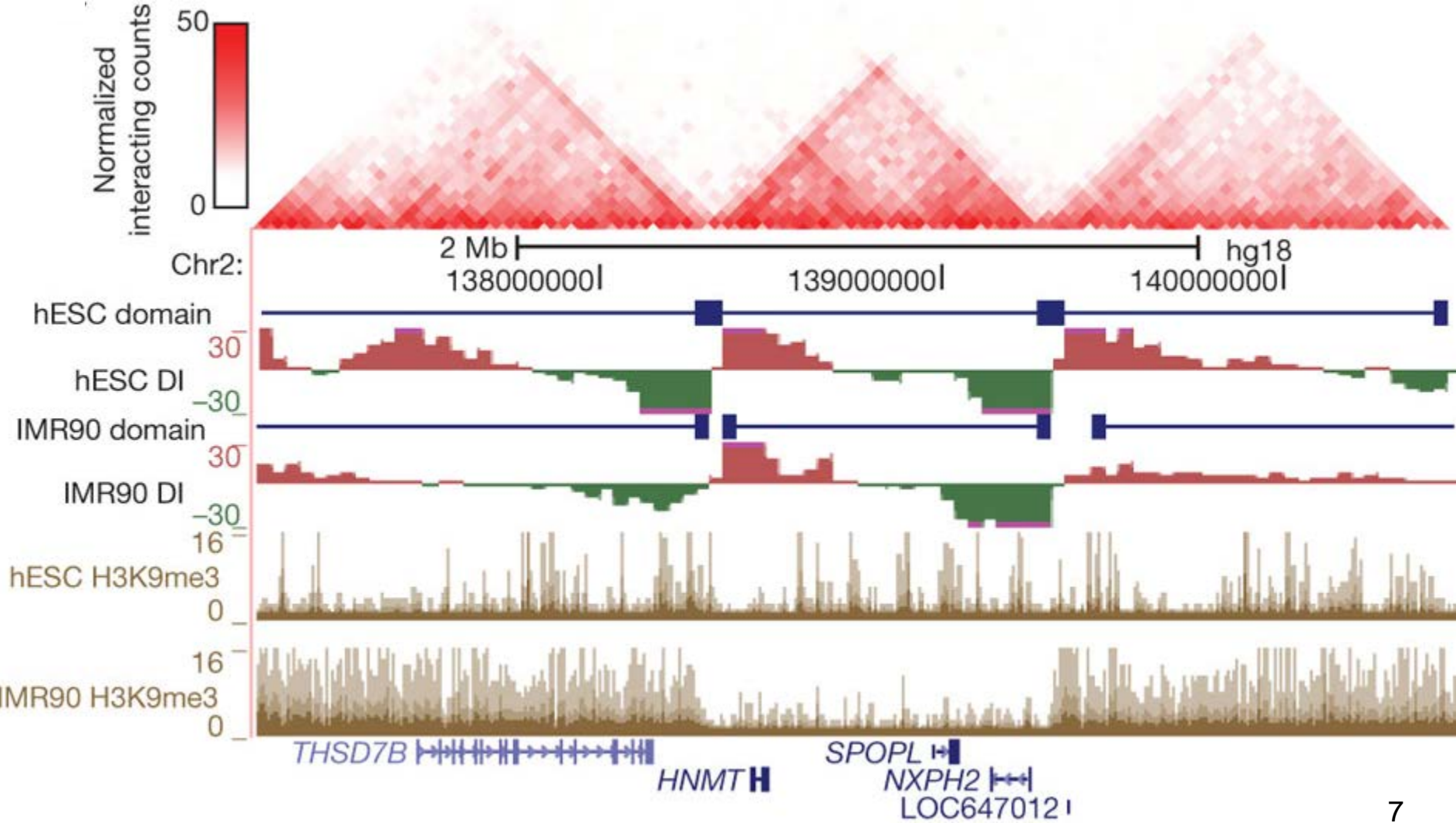
DNaseI at topo-domain boundaries



So it appears the boundaries are foci of regulatory activity.

Explore Hi-C interactions from perspective of total interactions per locus, in addition to directionality index (DI)

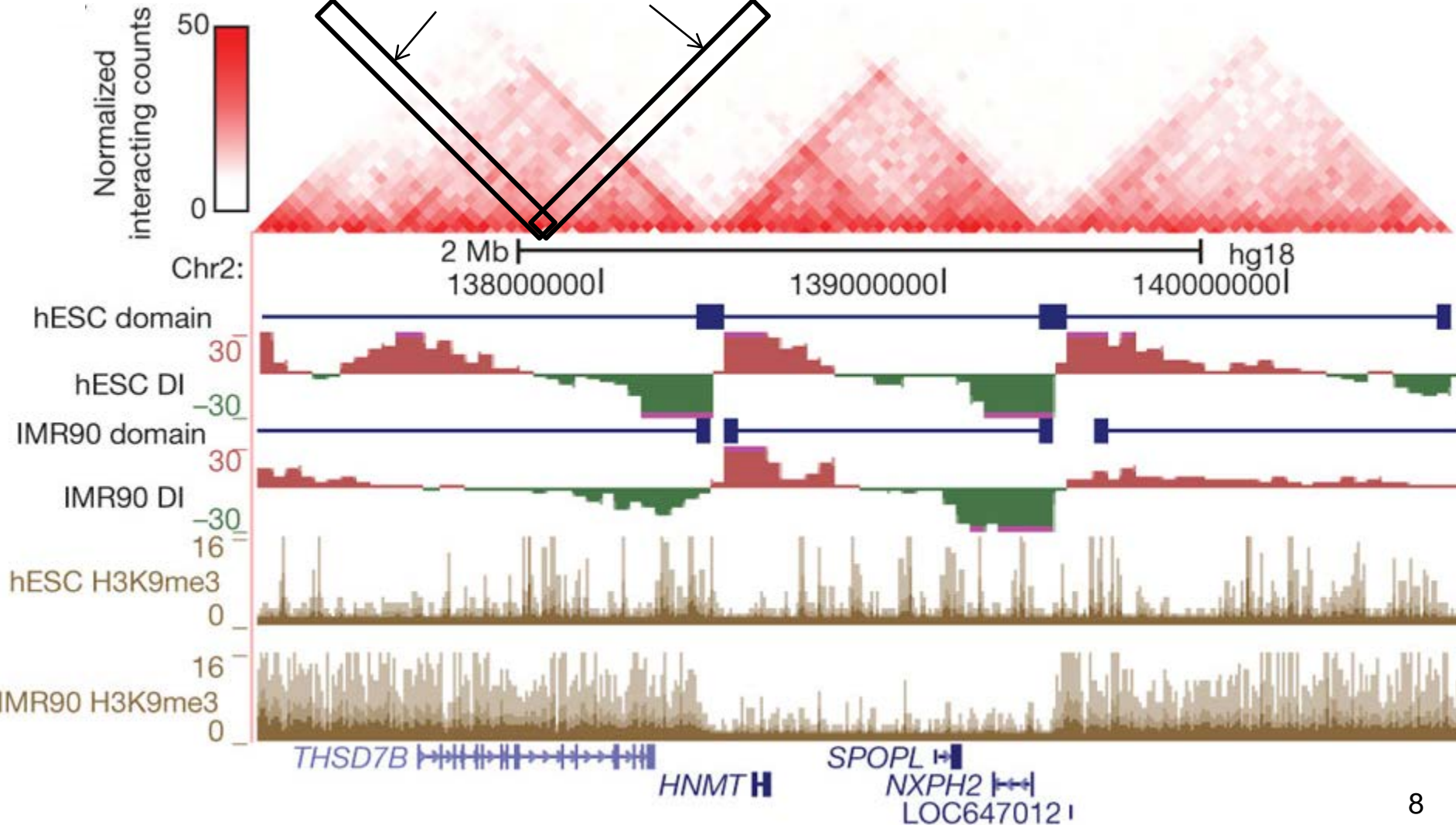
From Dixon et al., Nature



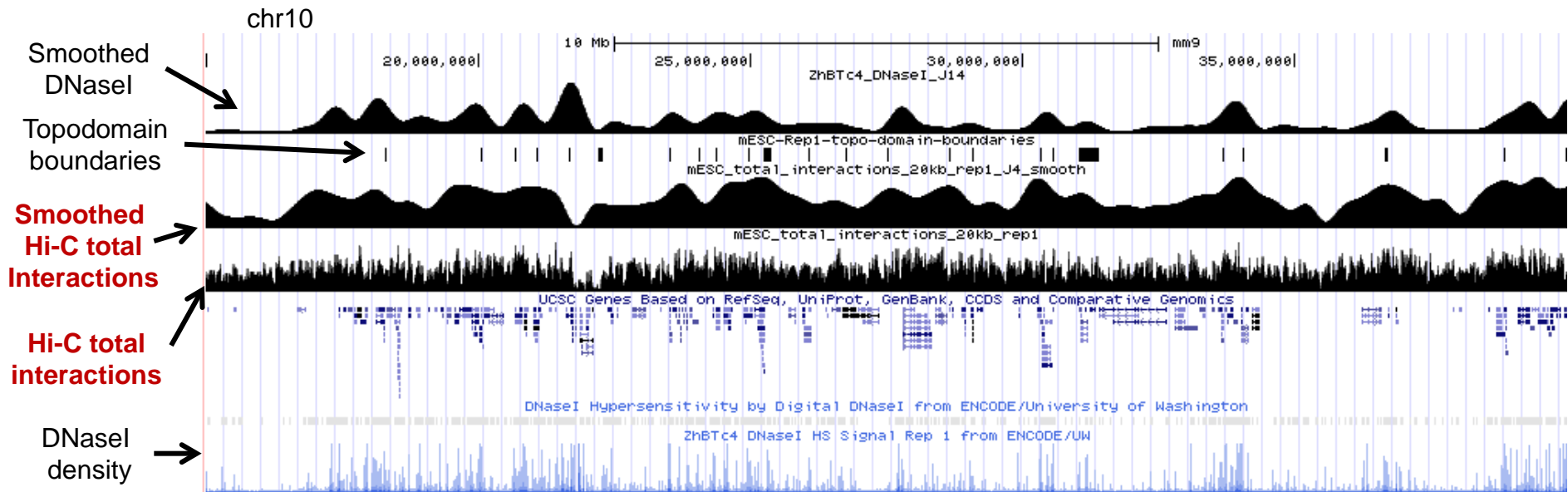
Explore Hi-C interactions from perspective of total interactions per locus, in addition to directionality index (DI)

Total interactions at locus
 = sum of two diagonals originating there
 (= sum across all columns of interaction matrix row)

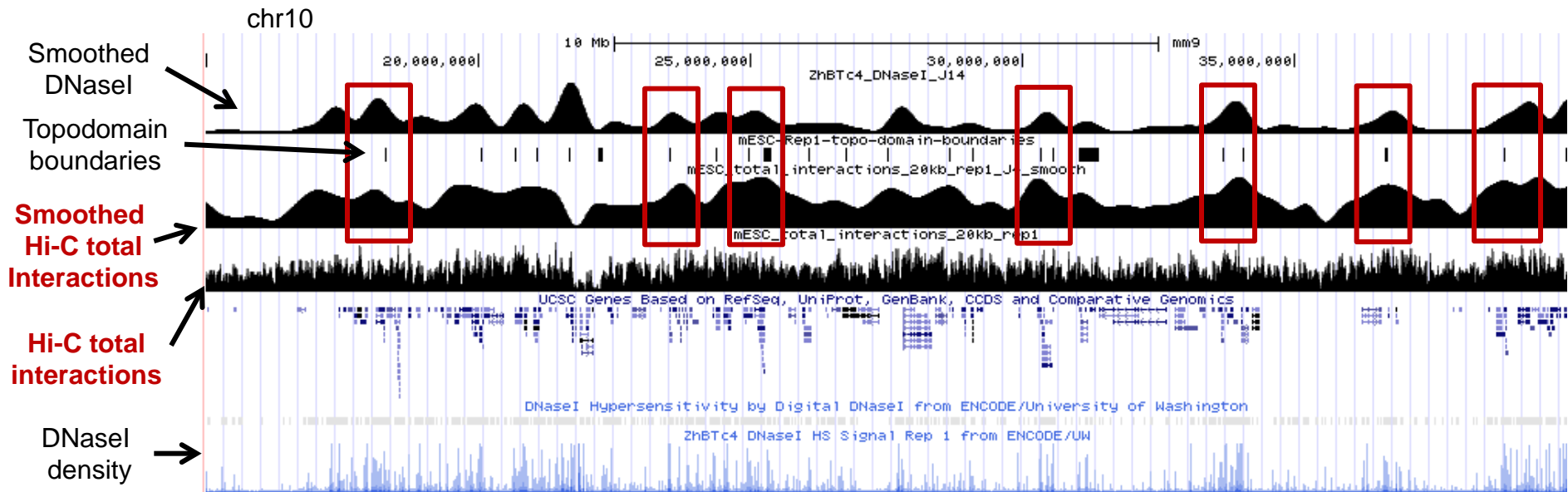
From Dixon et al., Nature



Explore Hi-C total interactions per locus

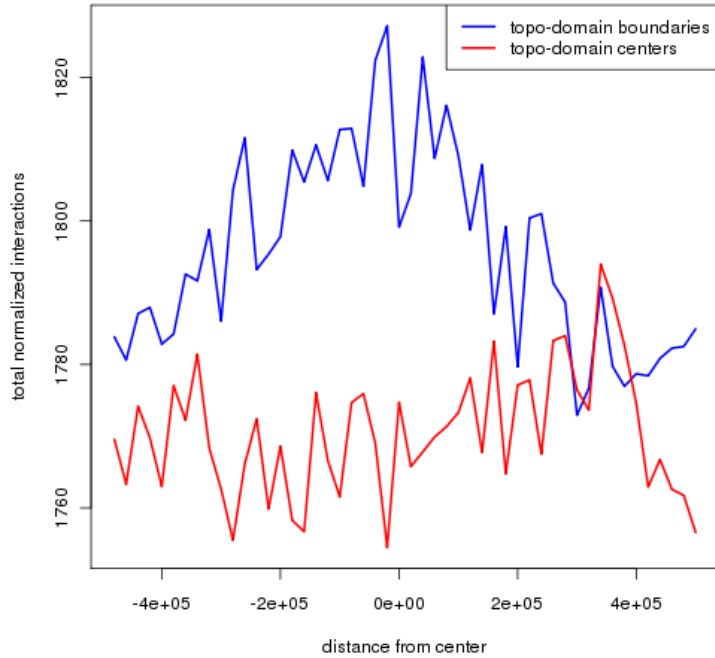


Explore Hi-C total interactions per locus

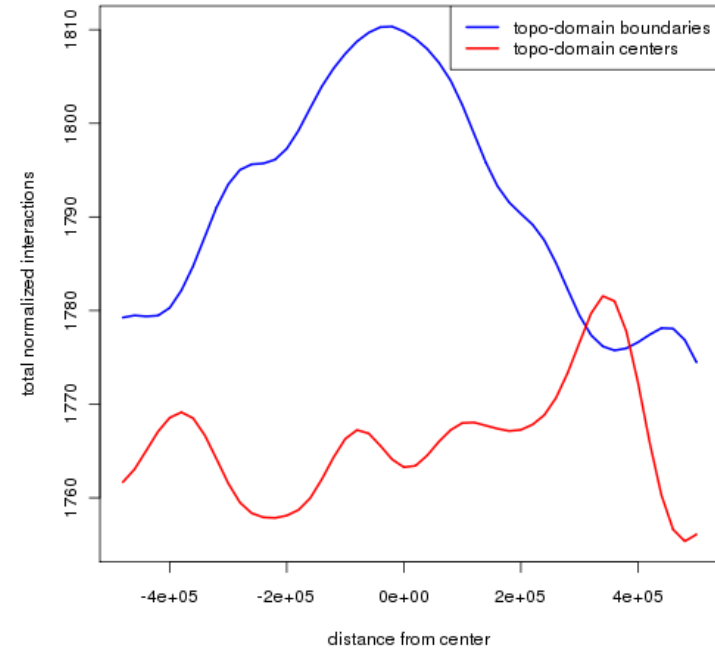


Explore Hi-C total interactions per locus

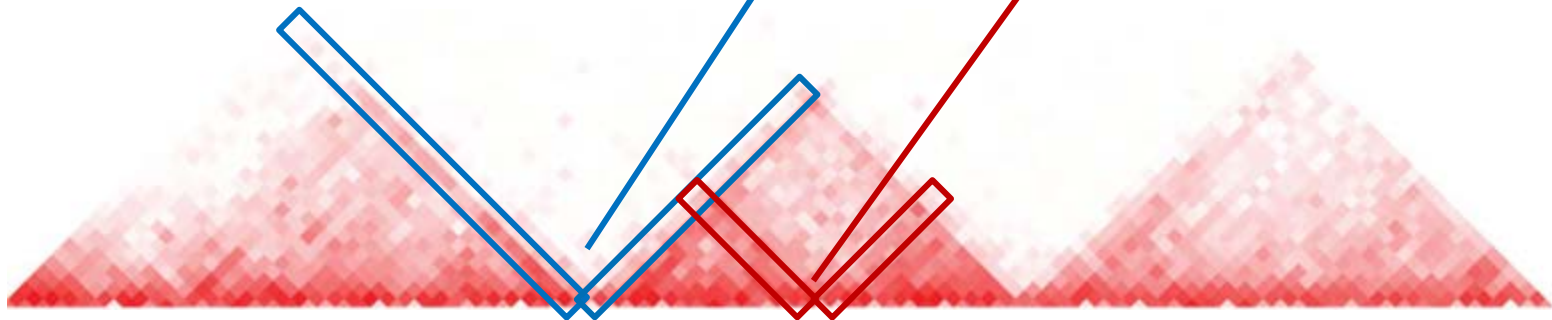
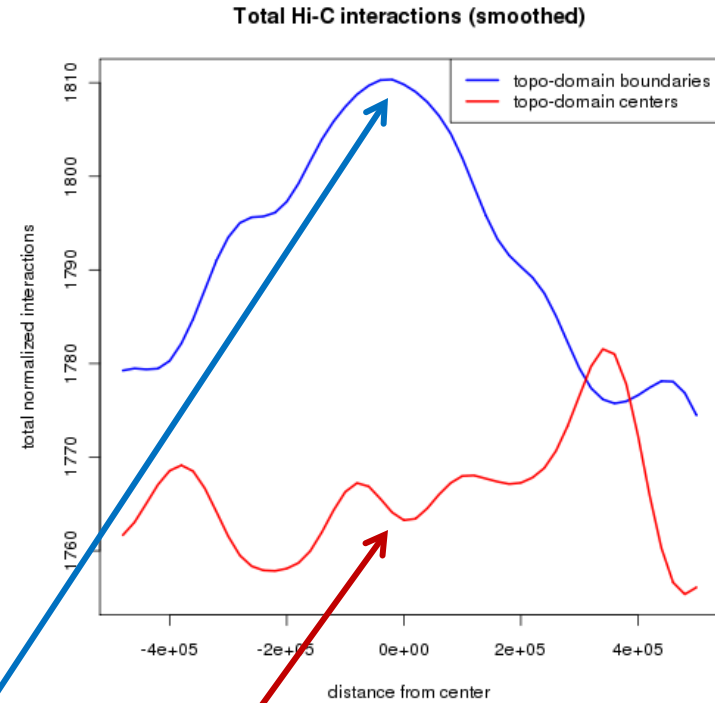
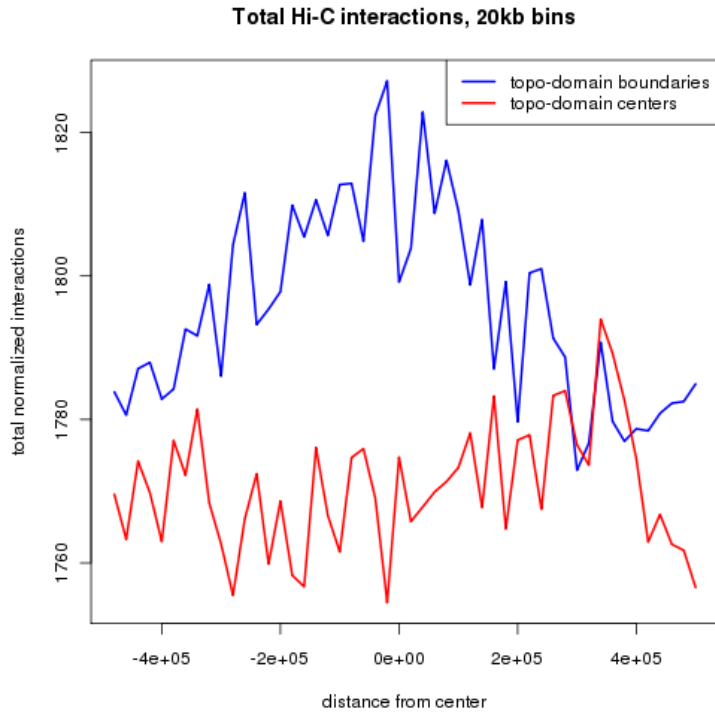
Total Hi-C interactions, 20kb bins



Total Hi-C interactions (smoothed)



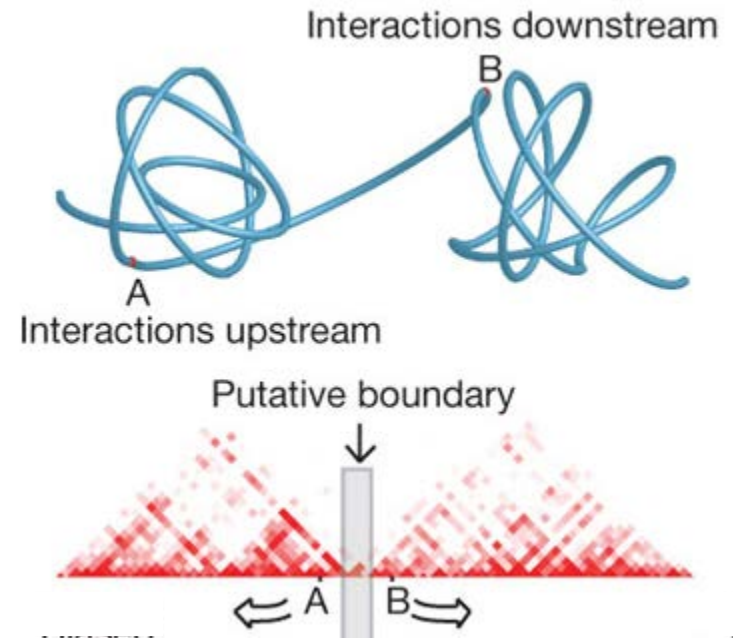
Explore Hi-C total interactions per locus



Interesting paradox that would like to understand better:

1. Topo-domain boundaries clearly separate directionality of interactions: the left hand (A) does not talk to the right hand (B).
2. And yet, boundaries appear to be foci of activity (H3K4me3, DNaseI, TSS).
3. ...and even enriched for interactions.

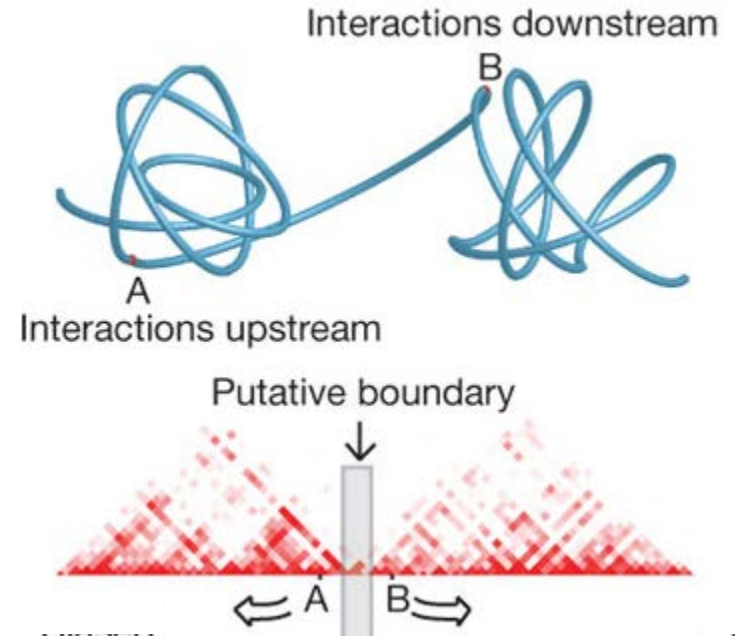
From Dixon et al., Nature



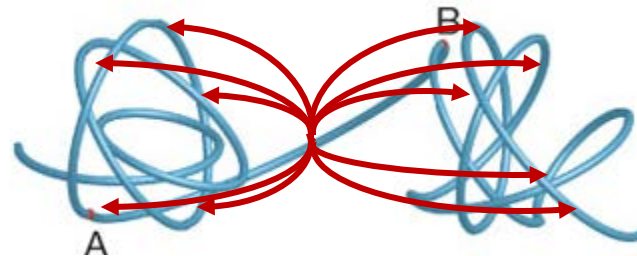
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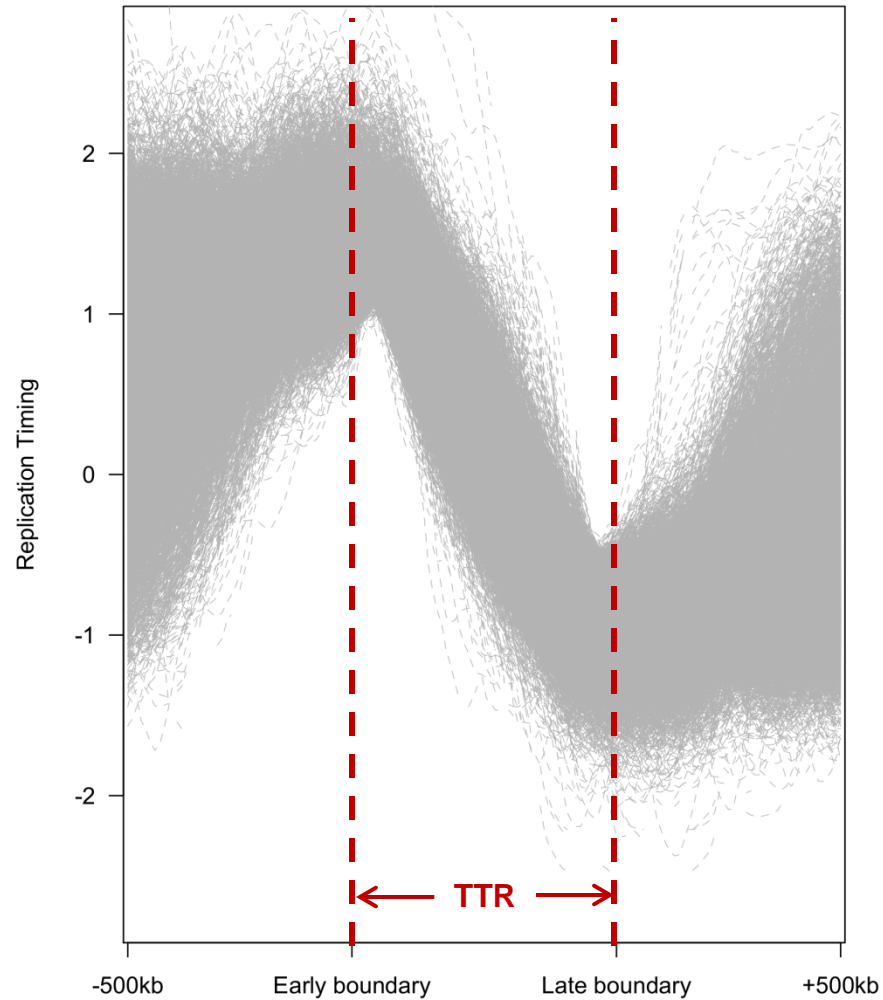
Further possible interpretation:



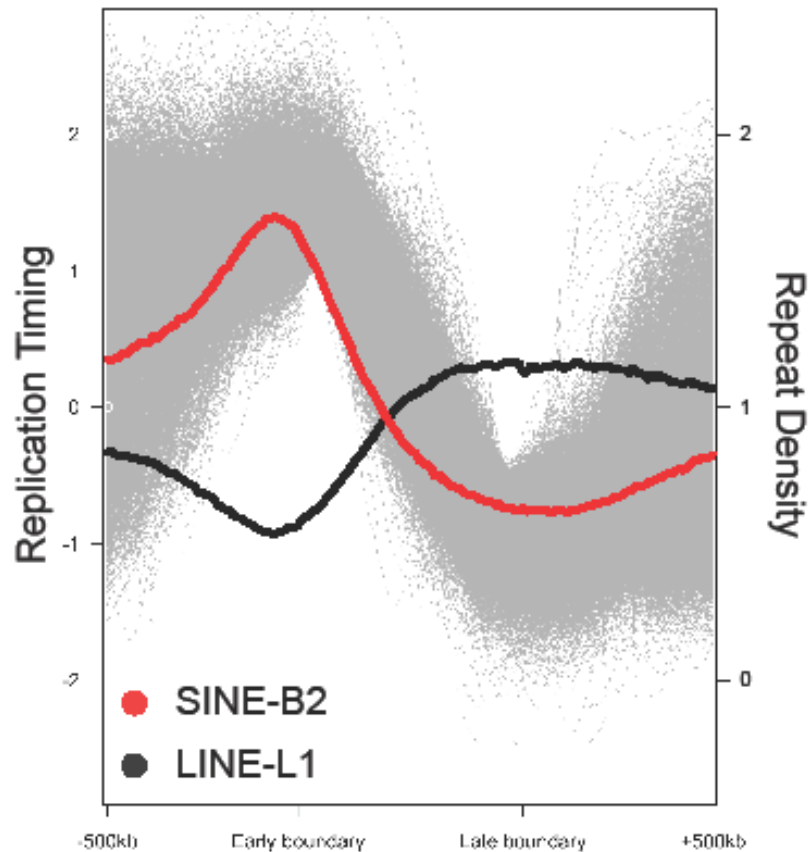
Boundary, which is open, contains key regulatory elements that are in dynamic physical contact with both A and B.

DNaseI in and around TTR (timing transition region) boundaries

From Tyrone and Ben...



Densities of several repeat families transition at early TTR boundaries



Also enriched at early TTR boundaries:

- SINE-B4
- SINE-ID
- tRNA
- snRNA
- scRNA
- srpRNA
- Satellite

DNaseI in and around TTR boundaries

