During winter, as strong easterly trade winds are forced through gaps in the Central American mountains, intense wind jets form on the Pacific side (a). New analyses of satellite data show that these wind jets affect the atmosphere two seasons later, in summer, through the ocean's memory. Thus, the nearly easterly Papagayo jet, most intense in winter as air rushes through a mountain gap on the border of Nicaragua and Costa Rica, forces upwelling Rossby waves in the ocean that push the thermocline close to the sea surface, creating the Costa Rica Dome (b), a spot that stays cool in summer in the otherwise warm ocean surface. This cool spot inhibits convection, and punches a hole 500 km in diameter into the summer rain band over the eastern Pacific warm pool (c).