Dinitrogen pentoxide which is in equilibrium with nitrogen trioxide and nitrogen dioxide can dissociate or react with water to form nitric acid ($HONO_2$):

$$N_2O_2 \longrightarrow NO_3 + NO_2, \quad (26)$$
$$N_2O_5 + H_2O \longrightarrow 2HONO_2. \quad (27)$$

Additional reactive pathways that can take place between oxygen atoms and NO_2 and NO include:

$$NO_2 + O(^3P) \longrightarrow NO + O_2, \quad (28)$$
$$NO_2 + O(^3P) + M \longrightarrow NO_3 + M, \quad (29)$$
$$NO + O(^3P) + M \longrightarrow NO_2 + M. \quad (30)$$

Also, NO and NO_3 can react to regenerate NO_2:

$$NO_3 + NO \longrightarrow 2NO_2 \quad (31)$$

Nitrous acid is produced by:

$$NO + NO_2 + H_2O \longrightarrow 2HONO, \quad (32)$$

and may react bimolecularly to regenerate the original reactants:

$$HONO + HONO \longrightarrow NO + NO_2 + H_2O. \quad (33)$$

The unexcited and first excited electronic state of the oxygen atom are produced by ozone photolysis in sunlight:

$$O_3 + \text{sunlight} \; (290\text{-}350 \text{ nm}) \longrightarrow O_2 + O(^1D) \text{ or } O(^3P) \quad (34a)$$
$$O_3 + \text{sunlight} \; (450\text{-}700 \text{ nm}) \longrightarrow O_2 + O(^3P) \quad (34b)$$

The singlet-D oxygen [$O(^1D)$] atom is much more reactive than the ground state triplet-P oxygen [$O(^3P)$] atom. For example, it reacts