

The change with time of the gigantic jet off the coast of Ibaraki on December 11, 2017 and comparison with the past jets

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Our school and Aoyama Gakuin University observed a kind of gigantic jet of transient luminous events on December 11, 2017. The occurrence point is identified with Ibaraki prefecture off the coast by way of the triangulation from 2 points, and the upper altitude is 66.3km. Also, we examined the gigantic jet by dividing it into five parts based on the characteristics of light emission. As a result, it becomes clear that the upper part emits light first, and after the light emission weakens, that of the lower part becomes stronger. Furthermore, it was considered that the gigantic jet was triggered by a discharge in the cloud due to the accumulation of a large amount of electrical charge in the troposphere, in comparison with the weather observation record and the previous research. In addition to them, we compared this jet with the three past gigantic jets and found out common and different points. As common points, all four jets occurred from late November to mid-December, and they almost didn't have rain. But their shape, altitude and light emission time are very different.

Keywords: gigantic jet, troposphere

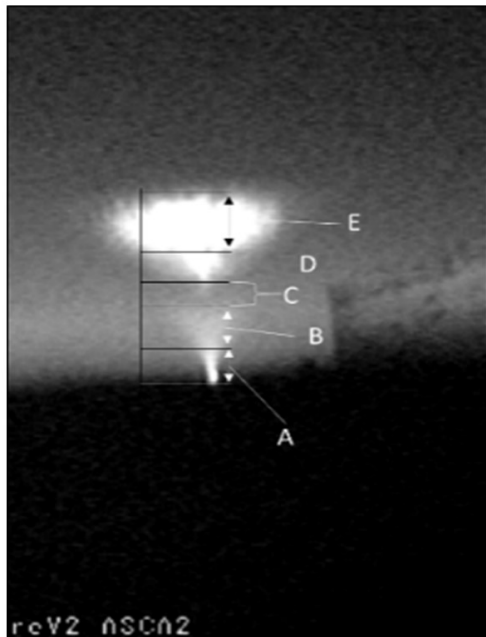


図1 ジェットの高度別の特徴
(青山学院大学段毛氏撮影)

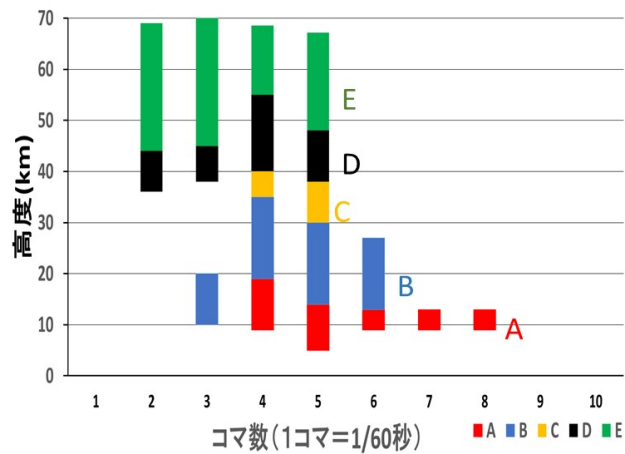


図2 ジェットの高度別の時間変化

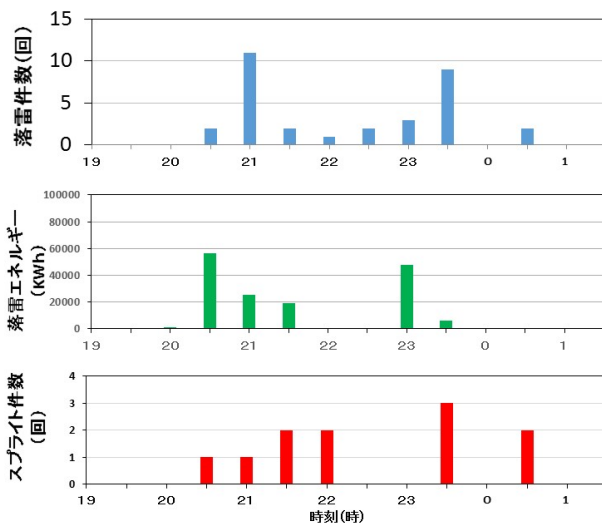


図3 落雷の発生回数とエネルギー、スプライトの発生回数の時間変化

表1 今回と過去三回の巨大ジェットの比較

	2008年の巨大ジェット	2010年11月の巨大ジェット	2010年12月の巨大ジェット	今回の巨大ジェット
発生地点	陸上 (石川県)	海上 (鳥取県沖)	海上 (能登半島沖)	海上 (茨城県沖)
上端高度	99.3km	120km	108.1km	66.3km
発光時間	約42/60秒	約8/60秒	約6/60秒	約7/60秒
形状	接木状	一体状	一体状	一体状
発生時期	11月下旬	11月下旬	12月上旬	12月中旬
前後の雨量	ほぼなし	ほぼなし	ほぼなし	ほぼなし
雲内放電	あり	不明	あり	あり
対地雷	なし	なし	不明	なし

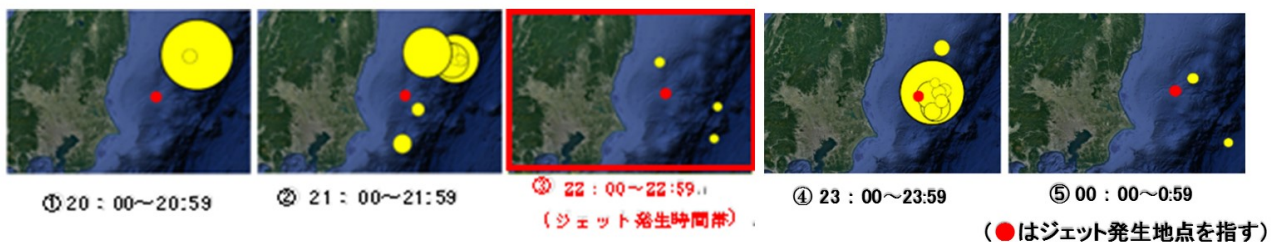


図4 落雷発生地点(半径=√エネルギー値, Google Earth(<https://www.google.co.jp/intl/ja/earth/>))を使用)