

1. 基本情報

区分	河川・湖沼	担当者名	長尾誠也
タイトル (英文)	The influence of a whole-lake addition of stable cesium on the remobilization of aged ¹³⁷ Cs in a contaminated reservoir		
タイトル (和文)	汚染域の湖沼における aged セシウム 137 の再移動に及ぼす安定セシウム添加の影響		
キーワード	¹³⁷ Cs; ¹³³ Cs; Reservoir; Water column; Sediments; Macrophytes; Remobilization; Typha latifolia; Nymphaea odorata		
著者	J.E.Pinder III, T.G.Hinton, F.W.Whichker		
文献	J. Environ. Radioactivity, 80(2), 225-243, 2005.		

(1) 対象地域

Pond 4 (Fig. 1) is located in the lower coastal plain of South Carolina, USA, in an area dominated by weathered soils with kaolinitic clays. It was constructed in 1961 as part of a canal system (Fig. 1A) to discharge >60 °C reactor- cooling waters at flow rates >10 m³ s⁻¹ to Par Pond. Cooling waters released from P reactor (Fig. 1A) traveled 5.6 km through the canal to enter Pond 4 along its southern edge. They exited along the northern edge of Pond 4 into neighboring Pond 5 before traveling an additional 2 km to Pond C and Par Pond. Water from Par Pond was subsequently piped to P reactor for cooling purposes and was again discharged through Pond 4 to Pond C and Par Pond.

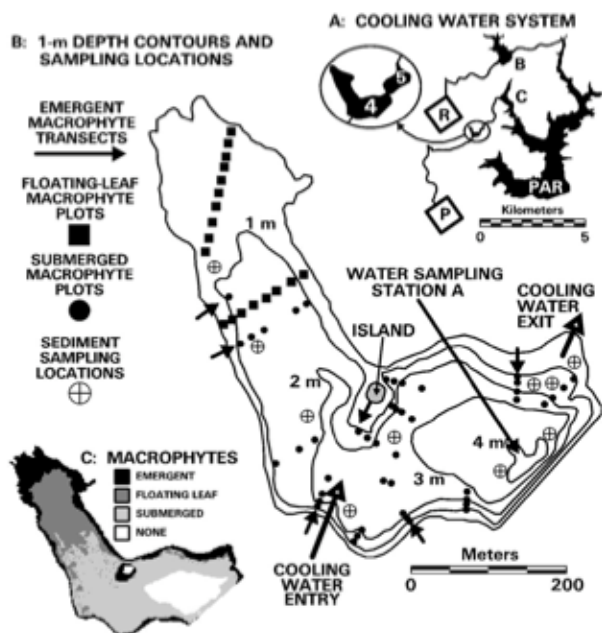


Fig. 1. Maps of Pond 4 including: (A) an overview of the canals and ponds of the cooling-water systems for P and R reactors showing the locations of Pond B and Par Pond and Ponds 4 and 5 in an enlarged area; (B) the 1-m water depth contours for Pond 4 with the cooling water canal entry and exit points, an island formed by reduced water flows, and the sampling locations for station A, emergent macrophyte biomass, floating-leaf macrophyte biomass, submerged macrophyte biomass, and sediments; and (C) the distribution of emergent, floating-leaf and submerged macrophytes.

(2) 重要な図表

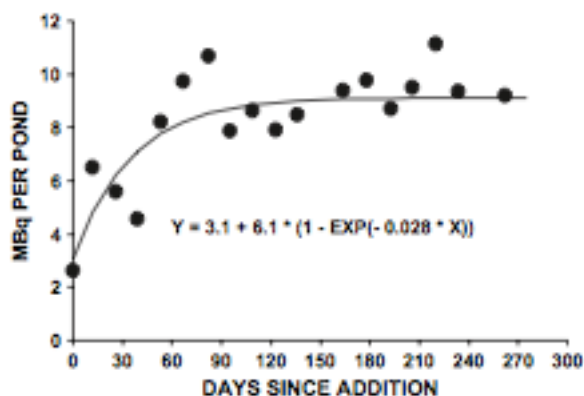


Fig. 4. The total ¹³⁷Cs inventory in the water column of Pond 4 following the addition of 4 kg ¹³⁷Cs on 1 August, 1999, and an asymptotic model fitted to the data to show an increase in inventory from 3.1 MBq to 9.2 (= 3.1 + 6.1) MBq.

2. 提言につながる情報

(1) モニタリングへの活用

(2) 流出挙動・経路

(3) 除染の際の留意点

(4) 担当者のコメント

一度、堆積物へ沈着した ^{137}Cs の安定性を調べるため、本研究では、過去の原子力発電所の稼働により汚染された調整池に安定セシウム、 ^{133}Cs を 4 kg、 CsCl の形態で湖水 157,000 m^3 に添加し、その後、湖水中の ^{137}Cs 放射能濃度を測定した。その結果、湖水中の ^{137}Cs 放射能の存在量は 3 倍 (6.1 MBq) まで増加した。この増加は、水中植物の ^{137}Cs 放射能濃度が増加したこと、室内実験の結果とその増加率がほぼ一致したことからも指示される結果である。